DOCUMENT RESUME

ED 059 913 24 SE 013 489

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TITLE A Review of Environmental Education for Elementary and Secondary School Teachers, Volume I of III. Final Report.
INSTITUTION Ohio State Univ., Columbus. Research Foundation.
SPONS AGENCY National Center for Educational Research and Development (DHEW/OE), Washington, D.C.
BUREAU NO BR-1-0277
PUB DATE Dec 71
GRANT OEG-0-71-2732
NOTE 186p.

EDRS PRICE MF-$0.65 HC-$6.58
DESCRIPTORS Case Studies; *Elementary School Teachers; *Environmental Education; Instructional Materials; Program Descriptions; Reports; Resource Materials; *Sciences; *Secondary School Teachers; *Social Sciences

ABSTRACT

This report, one in a series of three, is designed for elementary and secondary school teachers to familiarize them with the field of environmental education. Following a general orientation, specific problems and needs are identified and research related to these is noted. Current practices concerning environmental education programs and materials are summarized together with recommendations regarding their development and implementation. Brief descriptions of selected programs and materials and case studies describing program development and implementation are included. Sources of information for supplementary materials are also listed. A copy of the Environmental Education Curriculum Analysis Instrument, along with a summary of learning approaches to environmental education, conclude the work. This publication is the result of a cooperative project by the ERIC Clearinghouse for Social Studies/Social Science Education (ChESS), Boulder, Colorado, and the Clearinghouse for Science, Mathematics, and Environmental Education (SMEAC), Columbus, Ohio. For similar documents related to teachers of the urban/disadvantaged and school administrators see SE 013 490 and SE 013 491. (BL)

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Final Report
Volume I of III

Grant No. OEG-0-71-2732

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A REVIEW OF ENVIRONMENTAL EDUCATION FOR ELEMENTARY AND SECONDARY SCHOOL TEACHERS

December 1 71

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Office of Education

National Center for Educational Research and Development

SE 013 489

ABSTRACT

This publication designed for elementary and secondary school teachers begins with a discussion which provides the reader with an orientation to the problems associated with environmental education. Specific problems and needs are identified and research related to these is summarized. Current practices concerning environmental education programs and materials are summarized. Recommendations concerning development and implementation of environmental education programs and materials are made. Included are brief descriptions of selected programs and materials. Case studies describing program development and implementation are also included. Sources of information for supplementary materials are listed. A copy of the Environmental Education Curriculum Analysis Instrument is included, along with a summary of learning approaches to environmental education.

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The research reported herein was performed pursuant to a grant with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

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FOREWORD

This report, one of a series of three, is the result of a cooperative project by the ERIC Clearinghouse for Social Studies/Social Science Education (ChESS) at the University of Colorado, Boulder, Colorado and the Clearinghouse for Science, Mathematics, and Environmental Education (SMEAC) at The Ohio State University, Columbus, Ohio.

This joint effort permitted bringing together the complementary specialty areas of Social Science and Science as they relate to Environmental Education for purposes of reviewing educational materials and programs. An undertaking of this kind requires the cooperation of many people. We would like to express our appreciation for the contributions of the many people involved and most especially to: Mary Jane Turner, Larry Singell, Ellen Schultheis, Stanley Kleiman, Karen Wiley, W. William Stevens, Jr., Irving Morrissett, James E. Davis, Robert W. Howe, Patricia E. Blosser, Robert E.Roth, John Disinger, Beverly Lee, Maxine Weingarth, Linda Hemmeler, Anne Spencer, Frances Haley, Nancy Vickery, O'dette Havel, Peter Helburn, Connie Maupin, and Kacy Fowle.

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PART A: DISCUSSION

INTRODUCTION AND BACKGROUND

Environmental quality has become established as a national concern, prominent in the news media, in statements by government officials and in the lives of the public. A major focus of this concern is with the role of the schools in educating people to deal with the problems of a deteriorating environment. It is to this problem that this report is addressed.

The purpose of this project was to review materials and programs in environmental education to meet the expressed and identified needs of the target audiences: elementary and secondary school teachers, teachers of urban/disadvantaged, and school administrators. In so doing, the project undertook to review and summarize research related to environmental education; to identify, appraise, and describe promising programs and practices in light of the special needs of the target groups; to consider existing trends, gaps and weaknesses in educational materials and programs; and to present models of development and implementation.

Background of this Report

Considerable effort has gone into developing environmental education resources in this country in recent years. During the House Subcommittee hearings on the Environmental Education Act of 1970, both witnesses and committee members voiced the need for an inventory of these resources. Such an inventory would help us to avoid unnecessary duplication in future environmental education efforts, would indicate gaps and weaknesses in the field which need to be remedied, and would provide much-needed information to teachers, administrators, and other practitioners in need of help in selecting materials and building new programs.

In early 1971, the U. S. Office of Education commissioned the ERIC Clearinghouse for Science, Mathematics, and Environmental Education (ERIC/SMEAC) to conduct such an inventory of the environmental education materials produced under Title III of the Elementary and Secondary Education Act. Shortly thereafter, ERIC/SMEAC also undertook to survey existing non-Title III science education materials related to environmental education and the ERIC Clearinghouse for Social Studies/Social Science Education (ERIC/ChESS) began a survey of non-Title III social science materials containing environmental education components.

Content of the Report

Information needs of elementary and secondary school teachers were determined through interviews with representatives of that segment of educational personnel; through interviews with elementary school, secondary school, and college students, interviews with other persons involved in environmental education (such as state coordinators, teacher educators, etc.); and from an analysis of the literature (including research publications, program descriptions, articles regarding authors' opinions, conference reports, etc.)

Results of this data collection process were analyzed and are reported in the second section of this report, "Problems and Needs."

Section three presents a summary of research pertinent to the problems and needs identified. Section four presents a brief analysis of the current status of environmental education and identifies selected programs and materials which should be useful to the teacher concerned with environmental education. It is the intention of the authors of this report to supply information which will help teachers plan environmental programs and select environmental materials wisely and rationally and to direct them to sources of further information which my be useful in curriculum planning for environmental education.

Section five presents recommendations and suggestions for teachers regarding the development of environmental education programs. Recommendations identified are based on interviews with many people involved in environmental education, analysis of research related to environmental education, and analysis of literature related to environmental education, (both published and unpublished).

Part B of the report contains short analytic "data sheets" describing the operating programs and materials packages which were selected from those surveyed, a list on information sources related to environmental education, and a copy of the instrument used to analyze programs and materials.

Each program or set of materials analyzed has a separate data sheet. The identification at the top of each data sheet includes the name of the sponsoring institution, the name of the project, and the name of the program or the title of the materials. This is followed by a section giving data on the project directors or authors, the project address, the publisher and publication information, appropriate grade levels, and

dominant subject area orientation of the materials. The "Overview" provides an overall, "quickie" description of the materials. This is followed by more specific descriptive information on "Required or Suggested Time," "Intended User Characteristics," "Rationale and General Objectives," "Content," "Evaluative Data," and "Materials and Costs." The overall format of these data sheets was modeled after the format of the Social Studies Curriculum Materials Data Book (published by the Social Science Education Consortium, Inc., Boulder, Colorado), which has been found to be extremely useful by curriculum decision-makers.

A Framework For Environmental Education

In the last few years a number of problems have risen to the surface of national consciousness and have been discussed and worried about as though they were parts of one big problem, or were at least closely related to each other. These problems include pollution of many kinds, overpopulation, shortages and waste of natural resources, and deterioration in the environment and in the quality of life. We shall refer to this group of problems as "environmental problems," or "the environmental problem."

There is no one way to describe, analyze, and try to solve any particular problem or group of problems. This paper suggests a particular way of organizing our thinking about environmental problems, of analyzing their major causes, and of moving toward solutions. The purpose of suggesting such a framework is to simplify the study of these problems and their solutions-- that is, to facilitate "environmental education."

The need for a framework for thinking about environmental problems seems clear. With the recent and current interest demonstrated throughout the nation in environmental problems, there is a bandwagon effect which tempts many individuals and groups to declare that their particular interest or program is at the heart of the environmental problem. It is true that "everything is related to everything," and it is also true that one of the great lessons to be learned from the current concern with environmental problems is that some human actions and decisions have consequences which, although indirect and remote, may be cumulative and disastrous for human welfare. Nevertheless, it is absolutely essential that any problem area that is to be studied seriously be limited in scope. No problem can be analyzed and solved unless it is well defined and thus set off from a multitude of other problems. No group of problems can be studied profitably as a group unless there is some good rationale for studying them as a group rather than in isolation from one another.

There are three possible reasons for grouping a number of very specific problems into a general problem, or for grouping a number of general problems into a broad problem area. One reason is that the various problems may be explained by causes that are common or closely related; the second reason is that the problems may have very similar consequences; the third is that the various problems may be solved by common or closely related solutions. Usually a problem or problem area is defined to some extent by all three--commonality of causes, commonality of consequences, and commonality of solutions.

As an example of commonality of explanations, problems such as "Why and how do oxygen and hydrogen combine to form water?" "Why and how does exposure of iron to the atmosphere cause rust?" and "Why do some substances react with others, and some substances not?" form a group of problems which, it has been learned, can usefully be studied together because the explanations are all related to the structures of atoms and molecules.

As an example of commonality of consequences, problems such as "Why are most urban transportation systems poorly run and in constant financial difficulties?" "How should allowable heights of buildings be determined?" and "How should urban land and buildings be taxed?" have often been grouped together because they bear on a common batch of consequences, sometimes referred to as "the urban mess." As an example of commonality of solutions, problems such as "What speed will maximize the car-carrying capacity of a highway?" "Which intersections should be controlled by traffic lights, stop signs, yield signs or no signs?" and "What are the appropriate identification signs for police cars?" are grouped together because they are focused on a common group of solutions--that is, methods of traffic control.

The reluctance of persons concerned with environmental problems and environmental education to define the area of their concerns has led to a diffuseness in the discussion of the problems which is unlikely to lead to useful analyses of the problems or to successful resolutions of them. Virtually the whole of science education and of outdoor education have been declared by some persons to be a part of--perhaps the major part of--environmental education. To a lesser extent, large portions of social science education and of morality and ethics have been declared to be a part of environmental education. Accompanying these declarations about what the content of environmental education is or should be, there have been extensive efforts to get certain solutions adopted, based on little or no analysis of the problem. Solutions, the wisdom of which seems obvious to the proposers, have often been pushed vigorously, without analysis of the causes of the problem or of the

repercussions of the solution. A certain amount of the literature on the environmental problem might well be called "eco-evangelism"--the ardent propounding of solutions accompanied by little or no analysis of causes of, alternatives to, or results of the solutions.

Definition of the Environmental Problem, Environmental Science, and Environmental Education

The study of any particular aspect of existence, as has been stated above, is usually delimited by a commonality of causes, a commonality of consequences, or a commonality of expected or proposed solutions--although the dividing line between these three is not sharp. If the emphasis is on the causality, the field thus defined is usually called a science. If the emphasis is on the consequences or solutions, the field is likely to be called a problem, a problem area, or an applied science.

We suggest here three definitions which are closely related to each other. The "environmental problem" is defined first, because the whole group of issues related to the three definitions arose first as a problem or group of problems having interrelated consequences and calling for solutions. Environmental science and environmental education have been defined, for the most part implicitly, with respect to "environmental problems."

An "environmental problem" can be defined as a problem or group of problems that involve consideration or reconsideration of human value systems and either (or both) natural resources (human, soil, minerals, plants, animals, water, air, etc.) or social, biological, biophysical, or biosocial interactions.

"Environmental science" is defined as the study of real or perceived environmental problems.

For the purposes of this report the definition used is that included in The Environmental Education Act (Public Law 91-516) which defines environmental education as:

> the educational process dealing with man's relationship with his natural and manmade surroundings, and including the relation of population, pollution, resource allocation and depletion, conservation, transportation, technology, and urban and rural planning to the total human environment.

While no uniformly accepted definition of environmental education is currently in use among practioners, the U.S. Office of Education (1970) notes that some agreement does exist concerning the basic characteristics of good environmental education which include:

- a multidisciplinary approach, with an emphasis on the interrelationships of man and nature;

- a focus on contemporary problems relating to the urban and rural environment--manmade and natural;

- incorporation of nonformal as well as formal education processes and utilization of resources outside the classroom;

- development of understanding and attitudes as well as information;

- involvement of all age groups; and

- a participant-centered design, involving each learner/participant in choosing priorities both as to the issues to be studied and the solutions that seem most appropriate. This design allows the participant to learn "how to learn" about new situations, how to weigh alternatives and how to test solutions.

Most good programs involve action oriented activities.

PROBLEMS AND NEEDS

Sources

A variety of sources provided input in determining the needs and problems of persons responsible for environmental education. These sources included information requests directed to the ERIC system, elementary and secondary teachers, State Department of Education personnel, and literature related to environmental education.

Queries directed to the ERIC system tend to reflect the questions being raised elsewhere and are concerned with all levels of education, K-12. Requests for information occur as letters or phone calls to the Clearinghouses and as questions from individuals at conferences where ERIC is represented. Approximately 45 percent of the people asking questions are teachers, about half of whom are elementary and half secondary school teachers; about 25 percent are people such as principals, curriculum specialists, or supervisory personnel who have administrative responsibility for environmental education programs; about 10 percent are persons with combined positions such as supervision and teaching; and about 10 percent have miscellaneous or unidentified responsibilities.

Specific concerns, needs, and constraints with respect to environmental education were solicited from teachers by both the Columbus and Boulder branches of the project. The teachers included persons from rural, suburban, and urban areas with teaching responsibilities at both the elementary and secondary levels. Representatives were included from virtually every state in the union with the largest number of people from the states of Colorado, Ohio, Illinois, Wisconsin, and West Virginia.

Concerns about the environment and environmental education were also obtained from elementary and secondary school students in urban settings, primarily Ohio and Oregon, and from a small group of college students from urban communities in California, Ohio, Pennsylvania, Michigan, Illinois, New York, New Jersey, Massachusetts, and Missouri.

State Department of Education supervisory personnel responsible for social science, science, and environmental education from over 40 states were involved in conferences with ERIC/ChESS or ERIC/SMEAC personnel. The environmental education

information needs identified by the State people were determined with respect to both the kinds of information requested of them and the persons making the requests. With some variations, the originators, in order of numbers, of queries to State personnel seem to be elementary school teachers, administrators, and secondary school teachers. This order does not differ significantly from requests to the ERIC centers.

Literature in the ERIC system was reviewed to determine whether other questions or concerns of educators related to environmental education could be identified. Included were documents from other environmental conferences; curriculum and program development in the disciplines such as PSSC, BSCS, and the Geography Project; journals in the disciplines, in education, and administration; information on attempts to develop information kits such as those by the Far West Regional Laboratory; and, references related to teaching in urban-disadvantaged areas.

The personnel of the Social Science Education Consortium, in Boulder, Colorado, contributed to the general assessment of the field in at least two ways. The files of the Consortium were searched in order to determine kinds of assistance requested from practitioners in the field, and the educational position of the people making requests. Individual staff members prepared analyses of the sorts of questions they are asked to answer in the course of conducting workshops, in-service training meetings, and Resource and Reference Center tours. Secondly, the Consortium utilized the feedback and evaluation instruments which have been applied to revise their own Curriculum Materials Analysis System and the Data Book, published by the SSEC in 1971, in order to produce a "requested information" profile. The tabulations in this instance again gave similar results to the attempts noted above.

Identified Concerns

Generally speaking, teachers and administrators in elementary and secondary schools were quite explicit in their statements concerning the quality and kind of environmental materials and programs which are suitable for their school situations. In order to treat the identified concerns in a systematic way, questions raised will be summarized under the headings of Programs-Curricula and Materials. Existing research studies pertinent to these concerns and needs will be summarized in the SUMMARY OF RELATED RESEARCH section of the report.

Programs-Curricula

Most teachers felt that an interdisciplinary approach should be utilized as there are powerful concepts and models from all disciplines which should be used to explain environmental phenomena. A number of teachers seemed to favor a comprehensive or coordinated curriculum so that all disciplines in the school could become involved in environmental education. It was also suggested that a K-12 study has great merit since it can be both cumulatively and sequentially structured.

Interest was indicated in determining the knowledge needed by the teacher, the kind of background and preparation desirable, and teacher attitudes and characteristics most conducive for success with environmental education programs and curricula. Information on the emphasis of programs, whether value or content oriented, and specifications for any special equipment or facilities was deemed important by teachers.

Other kinds of information about various curricula which elementary and secondary teachers advised would be useful had to do with name of program or curriculum, publisher, materials available, costs, and format. They were interested in the rationale and objectives outlined by the developer, the flexibility of the content, and indications of the kinds and extent of media and materials employed. Other sorts of pertinent data which were requested had to do with structure of the course, grade level, reading level, discipline orientation, topical breakdown of content, student prerequisites to use, teaching strategies employed, and finally, evaluative data.

Two kinds of evaluative instruments were perceived as necessary to set standards for the field. One kind of evaluation that teachers want has to do with the problem of accountability. As community goals and objectives are made manifest, it is essential to have available mechanisms to test how well the school and its resources are implementing these objectives. The teachers and administrators would like instruments to evaluate what cognitive and affective achievement has been made. The second type of evaluative instrument, to be applied to materials, will be considered in the next section.

Finally, it was stated that a "model for involving the community" in the environmental education program was important. In most instances meaningful change can occur only after a total community commitment to that change can be obtained. The teachers

and administrators in schools are willing to act as change agents, but they would prefer to be co-equal partners in the process rather than defensive program leaders.

Materials

There was considerable interest expressed in all sorts of annotated bibliographic information such as lists of curricula, materials, films, records, books, articles, tested activities, kits, and experimental programs; lists of free or inexpensive materials; lists of resource materials to "educate" teachers; lists of government resources, such as government agencies, community organizations, private groups, and experts; lists of community on-site programs; lists of inservice opportunities; lists of colleges and universities with specialized courses; and lists of funding agencies, both government and private. Many suggested that a newsletter or publication would be an excellent vehicle in assisting them to keep updated and current.

Interest was also expressed in a multiplicity of supplementary and enrichment units which can be plugged into existing courses. These supplementary materials are thought to be particularly useful in helping make it possible to reach all students in heterogeneous classes. Materials geared to team teaching approaches would also be of value as would information on audio-visual, non-print media.

As was the case for programs, teachers were interested in knowing what kind of background preparation was needed in order to successfully use materials, whether inservice training was necessary, and what, if any, facilities or equipment might be needed to adapt or adopt existing materials.

As was noted earlier, an evaluative tool which can be applied to the materials themselves is needed. As it becomes necessary to select materials, there should be some sort of standard mechanism with which to make comparable judgements. A prototype which was suggested was the SSEC's Curriculum Analysis System.

SUMMARY OF RELATED RESEARCH

Introduction and Identification of Generalizations

This section summarizes some generalizations regarding learners, instructional materials, facilities, and program organization that should provide guidance in the development of environmental education programs and development or selection of environmental education activities. Generalizations presented are selected from research reviews cited at the end of this section.

Listed below are selected generalizations with comments relative to programs and materials.

1. If skills or information are learned in a context similar to that in which they are used, learning is more likely to transfer.

2. Students usually learn information or skills easier which are related to information or skills they have previously learned.

3. Other things being equal, the longer since an experience, the harder it is to remember. Ideas learned earlier can be reinforced by reuse.

4. The more concrete the concept, the more easily it is attained. Normally, children attain concepts in order of increasing abstractness and complexity.

5. Positive instances (examples of what the concept is) usually are more effective for learning than are negative instances.

6. Opinions and attitudes developed early in life tend to be influential during later periods in life.

7. The relationship between attitudes and opinions and cognitive achievement is not well supported.

8. Most opinions and attitudes are not developed during a short span of time.

9. Opinions and attitudes are influenced by the geographical region and the urban-rural location in which a person lives.

10. Opinions and attitudes can be changed, but it appears that once a person becomes committed to a position, that commitment itself becomes a barrier to change.

11. Activities and materials should be within the ability ranges of the students involved in the activities and using the materials.

12. People normally are more highly motivated toward involvement if they have had a role in determining the activity or action.

Implications for Environmental Education Programs and Materials

Activities and materials related to environmental education should be introduced early in the school program and continued emphasis should be provided throughout the program. Providing content emphasizing the areas in which the children live and expanding to other geographical regions beyond their first-hand experience would provide experiences that students can relate to psychologically. Concepts should also be more easily attained. Elementary school programs should include experiences to develop desired affective, cognitive and psychomotor outcomes. It should be noted, however, that there appears to be little relationship between cognitive achievement and opinions and attitudes.

Programs and materials for upper grade students should deal with the local environmental setting with more complexity, should provide experiences regarding other geographical regions, as well different community settings (urban-rural). These experiences should continue over time (more than one week or six weeks) and involve the student in using skills, information and attitudes in the settings that exist in society. This indicates the need for extensive planning and cooperation between the school, the local community groups, and other organizations and governmental agencies. In all grades, but especially the upper elementary and secondary school grades, students should be given considerable opportunity to help determine the problems and topics for study.

These suggestions indicate the need for a planned program that provides flexibility for students and teachers to make decisions regarding specific program components. A variety of materials are clearly needed, and it would seem that material needs would vary, both in terms of content and in terms of presentation, from urban to rural areas and among rural areas and among urban areas. Effective programs might use materials developed in other areas, but it would seem that <u>adapting</u> and <u>modifying</u> materials would be more effective than <u>adopting</u> materials.

Implications for Environmental Education Facilities

A considerable amount of the environmental education program should be conducted in real settings (urban, suburban, rural, natural, etc.). This suggests the need for selected sites to which the student can be taken, designed sites at the school setting, or (if the former two are not possible) simulations and media presentations which will provide a reasonable representation of the actual setting.

An inventory of available sites should provide a school with indications of what needs to be identified, developed, or purchased regarding sites or simulation materials. A review of school programs indicates that programs that inventory and use community resources are not as limited by facilities as are many programs which stay within the school building or which use a set facility (such as a nature center). Cooperation and coordination of governmental agencies, (city, county, state, and federal) local groups, and school personnel can often provide the diversity of facilities needed without the large capital expenditure and operating budget required by single school ownership and management.

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Reviews over 85 studies in environmental education in the areas of programs, materials, instruction and administration.

SUMMARY OF SELECTED PROGRAMS AND MATERIALS

Just as there is little uniformity among educational practitioners in the way in which environmental education is defined, so is there little uniformity among environmental education programs and materials. Some are developed around a single problem or theme, while others include broad areas of concern. Some reflect a discipline orientation while others are inter- or multi-disciplinary. Some are intended for a limited user group, others are aimed at a broad range of teachers and students. It will be the purpose of this section to describe briefly and summarize existing programs and materials in terms of general characteristics. Materials and programs more directly appropriate for the urban setting are presented in Volume 2 of this report.

Programs

School Based Programs

Summarization of the interviews conducted, questions asked by practitioners, literature and research reviewed over the past year indicates that there is widespread agreement that schools should develop environmental education programs on a K-12 basis and that these programs should fit into the existing school curriculum. Several such programs exist. However, based on the number of school systems in the country, these reflect a relatively small percentage of the total. Examples of programs showing promising trends and practices are noted.

The Ann Arbor, Michigan, Public Schools program is a K-12 program designed to present conservation understandings in a logical sequence. The program is integrated within the framework of the existing curriculum and intends to link together subject areas, particularly science and social studies. It emphasizes the study of the natural community resources under natural conditions and utilizes direct involvement of the learners in problem solving situations with stress on attitudes rather than skills as intended learning outcomes. This program originated, as did most of those in existence, as an attempt to deal with a narrower field of concern, conservation, and has since broadened to a degree more in keeping with environmental education. (Part B, p. 34)

Another K-12 program, in the Madison, Wisconsin, Public Schools, is aimed at developing a systems approach to environmental education using community and school resources. This program emphasizes the interdependence of man with his environment and views concept formation as occurring when pupils develop understanding, attitudes, and interests which make concepts become positive values. Pupils are directly involved with the environment, utilizing a school forest, a nearby marsh, and sites developed on some of the school grounds. Media including filmstrips, tapes, and films are utilized as is team teaching in parts of the program. (Part B, p. 36)

A program operating within the school structure but which originated within the Wisconsin Department of Public Instruction is Project I-C-E at Green Bay, Wisconsin. The major program goal is to improve instruction and curriculum, using environmental education as a vehicle. The areas of social studies, language arts, and science are already included within the program and plans are developed for the inclusion of other areas such as fine arts, mathematics, business education, etc. Emphasis is placed upon community resource development and support. (Part B, p. 38)

A program modeled after the Ann Arbor, Michigan, program is that in Yarmouth, Maine, a K-6 program which emphasizes developing attitudes toward environments. The study environments are selected to provide for expanding scope and complexity of understandings and range from the school environment at the K-1 level, to the neighborhood for grades two and three, to the community for grades four and five, and, finally, to the region for grade six. Twelve environmental themes are utilized with each of the environments and involve the students in activities in the environments. (Part B, p. 40)

The Billings, Montana, School District program is currently operating for sixth grade only but is intended to be expanded to K-12 in the future: a pattern that is common among school systems in the process of developing programs. This program is somewhat unique in that its first five years of operation were funded entirely by the local PTA groups. This program is aimed at dealing with attitudes and actions rather than with the "symptoms" of environmental problems such as pollution. A two-day camp experience is the focal point of the program and includes instruction in the four basic areas of ecosystems, geology, geography, and plot studies and experiences in first aid, art, recreation, and music and dramatics. (Part B, p. 42)

A program developed around a single theme is the Tilton School Water Pollution Program in New Hampshire. This program, for grades 7-12, aims to channel student curiosity into productive activity and emphasizes activity outside the classroom as a means of making the program relevant to students. High school teachers, students, scientists, and technicians cooperated in developing the curriculum guide which takes an action-oriented approach to environmental education and draws upon several areas in the sciences and social sciences. (Part B, p. 45)

A number of other programs worthy of note are in operation around the country. Examples of these are programs such as the Outdoor School in Milwaukie, Oregon; the Parkrose Public Schools Conservation Education program in Portland, Oregon; the Marshall Outdoor Laboratory, Lynwood, Washington; the program at Morgan Elementary School, Utica, Michigan; the Bourbon County Environmental Education Project, Paris, Kentucky; the Interdisciplinary Outdoor Education Program, Seattle, Washington; the Environmental Education program at Edmunds, Washington; and the Stepping Stone Environmental Education program at Branchville, New Jersey. While several others could be cited, these will serve to indicate something of the widespread distribution of programs related to environmental education.

School-Related Programs

Many programs do not operate within the school structure but rather are the result of a cooperative effort involving one or more school systems with a center or facility in the local area or region. Very often these programs are designed to take advantage of some unique features and characteristics of the setting. An example of this type is the Regional Marine Science Program in Carteret County, North Carolina. While this is not an environmental education program in the broader sense, it is an excellent example of an operational program that is activity-oriented, involves a cooperative effort, and utilizes unique aspects of the region. The program emphasizes ecology and focuses on the field trip as an important teaching strategy in each of the three-week teaching units for grades 4-10. (Part B, p. 47)

The Environmental Science Center program in Golden Valley, Minnesota, is another program that operates cooperatively with schools in the area. This program ranges across grades K-12 and includes adult and vocational education as well. A series of 43 activities has been developed which can be implemented within the existing curriculum. No particular sequence is required. This permits the teacher to order the activities as needed. Field trips are available as a part of the program, with Center personnel aiding in the planning and utilizing of facilities. From an origin primarily oriented toward science, the program has expanded and is currently developing materials with greater emphasis on the social aspects of environmental education. (Part B, p. 49)

An example of a program with a regional basis is located at the Conservation and Environmental Studies Center at Browns Mills, New Jersey. This program, for elementary and junior high school students, provides week-long resident programs for the students, their teachers, and high school student assistants, as well as college interns. Activities are intended to fit within the school curriculum and to aid teachers in developing their own environmental education programs. While most of the materials developed by the Center deal with the local environment, many could be easily adapted for use elsewhere. (Part B, p. 52)

The Conservation Education Center at Land Between the Lakes, Kentucky, came into being as part of a national demonstration center under the auspices of the Tennessee Valley Authority. A basic purpose of the program is to introduce resident outdoor and conservation education to educators. Very low emphasis is placed on the development of materials within the Center, but staff personnel aid schools in developing materials for use with their own programs. (Part B, p. 55)

The Environmental Education Program for grades 1-12 of the Paducah Independent Schools was designed specifically for use with the Youth Station Facilities at Land Between the Lakes. Materials and activities were cooperatively developed by personnel of the Center and the schools, and require the direct involvement of students with the environment. Most are inquiry oriented and are drawn from the areas of art, social studies, mathematics and science. Although developed for use with a specific site, most of the activities can be easily adapted for use with other programs and locations. (Part B, p. 57)

A wide variety of school-related programs, sites, and facilities could be cited. Again to indicate the nature of their distribution, a few such examples include the Kemmerer Outdoor Laboratory, Kemmerer, Wyoming; the Liberty Council of Schools Conservation Education Center at Lincoln, Massachusetts; the Natural Resources Demonstration Center; DeKalb, Illinois; Schulkill Valley Nature Center, Philadelphia, Pennsylvania; and the Environmental Education Laboratory, Albuquerque, New Mexico.

National Programs

Two closely related programs have been developed on a national basis for use with local school systems. The NEED program, operated by the National Park Service, is an interdisciplinary program based on the premise that environmental awareness requires outdoor implementation of classroom lessons. The program is concerned with aiding local school systems in developing teaching materials, programs, and experiences for levels K-12 to help enrich the existing curriculum with environmental concepts. Emphasis is on organizing activities around five conceptual strands that run through lessons in mathematics, science, art, social studies, and communications. (Part B, p. 59)

The NESA program of the National Park Service is intended to make use of natural and cultural sites as environmental study areas to provide different kinds of learning experiences for students in gades K-12. Areas have been designated throughout the Park System and on other lands as environmental study areas for use by local school systems. The program is developed around five environmental strands and the NESA guidelines provide a framework for teachers to develop programs suitable for local needs. Workshops are conducted to provide teachers with an introduction to the study area, with resource materials, and with suggestions for adapting the experiences into the school curriculum. (Part B, p. 62)

Materials

Introduction

Analyses of current school programs indicated that relatively few schools had environmental education programs or well defined plans for incorporating environmental topics into existing curricula. Teachers interviewed desired information about materials that would be useful for developing environmental education programs, courses, units and activities.

A number of selected items for use in developing environmental education experiences are briefly reviewed in this section of the report and are described in more detail in Part B. Most of the materials identified are print materials rather than non-print. It should be noted that these materials are selected examples of material available.

Extensive annotated resource lists developed by the ERIC Center for Science, Mathematics, and Environmental Education in cooperation with the Center for Science and Mathematics Education at The Ohio State University are available. These bibliographies include articles, books, textbooks, units, filmstrips, films, games, and simulations. The following resource lists are available:

1. The Urban Environment
2. The Rural Environment
3. Water Pollution
4. Air Pollution
5. Energy
6. Solid Wastes
7. Land Use
8. Population
9. Recreation

Resource lists are $1.25 each for one or two publications and $1.00 per copy for orders of three or more publications, regardless of title. Resource lists may be ordered from:

The Center for Science and Mathematics
Education
The Ohio State University
244 Arps Hall
1945 North High Street
Columbus, Ohio 43210

Other related resource lists will be developed in the future.

Generalizations about Materials

Any appraisal of the world of environmental education immediately suggests some generalizations about the field. Although the quality is spotty and uneven, there is a reasonably large number

of materials packages from which to choose. There is less variety of good material for early elementary grades, however, than for grades four through twelve. Although much of the material might be useful for good readers in the inner city or have worthwhile content, it must be noted that low reading level and appropriate content may not always be found in the same package. Material to enhance the self-image of the ghetto child is also often difficult to find.

Much of the material is interdisciplinary in scope to the extent that it draws on the concepts and generalizations from most of the social science or science but rarely both. In the social science materials, anthropology and sociology are probably the least represented in the packages analyzed. A great deal of what is available can be utilized to supplement or enrich on-going courses, however.

While many of the materials reviewed are traditional in content and strategy, there is a fair number which utilize a wide range of multi-media and classroom strategies. Among the most useful are perhaps those that incorporate various modes of inquiry, discovery, participation, and group research. For the most part, the materials are school and classroom oriented and are not geared to action programs.

By carefully selecting, adapting, and modifying, the curriculum developer can develop materials suitable for the needs of the student, program, community and region. Examination of operating programs will provide ideas on ways in which materials have been and can be used. Because most existing environmental education programs had their origins in science, conservation, or outdoor education, many of them tend to reflect this orientation in both materials and processes. It is therefore, especially important that teachers and curriculum developers pay close attention to social science and related materials when designing learning experiences. The listing of selected example materials reflects this concern.

Materials for Elementary School Pupils

1.	American Geological Institute Environmental Studies Project	(1-12)	Part B, p. 97
2.	University of Minnesota Project Social Studies: Family of Man	(K-5)	Part B, p. 109
3.	Joint Council on Economic Education Natural Resource Use in our Economy	(3-12)	Part B, p. 113

4. Educational Research Council of America
   Concepts and Inquiry (4-6) Part B, p. 115

5. Group for Environmental Education, Inc.
   Our Man-Made Environment, Book Seven (4-11) Part B, p. 119

6. Field Social Studies Program
   Working, Playing, Learning (1)
   People, Places, Products (2)
   Towns and Cities (3)
   Regional Around the World (4) Part B, p. 128

7. Colorado, University of
   Our Working World: Cities at Work
   Our Working World: Neighbors at Work (2-3) Part B, p. 132

8. Rhode Island College
   Providence Social Studies Curriculum (K-12) Part B, p. 136

9. Elementary Economics Project
   Industrial Relations Center
   University of Chicago
   Economic Man (6-8) Part B, p. 143

10. South Carolina, State Dept. of Education
    Conservation Curriculum Improvement Project
    People and Their Environments (1-12) Part B, p. 141

11. American Association for Health, Physical Education, and Recreation
    National Education Association
    Association of Classroom Teachers
    Man and His Environment, An Introduction to Using Environmental Study Areas (K-12) Part B, p. 148

12. Interaction Science Curriculum Project
    Interaction of Man and the Biosphere (6-9) Part B, p. 152

13. Science Curriculum Improvement Study (1-6) Part B, p. 156

14. State of California
    Environmental Education Program
    Ekistics (1-12) Part B, p. 159

15. Education Development Center
    Man - A Course of Study (4-6) Part B, p. 161

Materials for Secondary School Pupils

1.	American Geological Institute Environmental Studies Project	(1-12)	Part B, p. 97
2.	Economics in Society (formerly Econ 12)	(9-12)	Part B, p. 100
3.	California, University of, at Berkeley Asian Curriculum Project Asian Studies Inquiry Program Man and His Environment in Asia Food and Survival in Asia	(10)	Part B, p. 104
4.	Joint Council on Economic Education The Economics of Pollution	(9-12)	Part B, p. 107
5.	Joint Council on Economic Education Natural Resource Use in Our Economy	(3-12)	Part B, p. 113
6.	Educational Research Council of America Concepts and Inquiry	(7-9)	Part B, p. 115
7.	Group for Environmental Education, Inc. Our Man-Made Environment, Book Seven	(4-11)	Part B, p. 119
8.	Harvard University Social Studies Project Municipal Politics Science and Public Policy	(7-12)	Part B, p. 122
9.	High School Geography Project Geography in an Urban Age, Unit 5: Habitat and Resources	(7-12)	Part B, p. 125
10.	Rhode Island College Providence Social Studies Curriculum	(K-12)	Part B, p. 136
11.	Social Issues Resource Series Population Pollution	(10-12)	Part B, p. 139
12.	South Carolina, State Dept. of Education Conservation Curriculum Improvement Project People and Their Environments	(1-12)	Part B, p. 141
13.	Elementary Economics Project Industrial Relations Center University of Chicago Economic Man	(6-8)	Part B, p. 143

14. Carnegie-Mellon University
Slow Learner Project
Americans in Cities (9) Part B, p. 146

15. American Association for Health, Physical Education, and Recreation
National Education Association
Association of Classroom Teachers
Man and His Environment, An Introduction to Using Environmental Study Areas (K-12) Part B, p. 148

16. Biological Sciences Study Commission
BSCS Green Version: High School Biology (9-12) Part B, p. 150

17. Interaction Science Curriculum Project
Interaction of Man and the Biosphere (6-9) Part B, p. 152

18. Addison-Wesley Publishing Company, Inc.
Air Pollution
Water Pollution
Noise Pollution (7-9) Part B, p. 154

19. State of California
Environmental Education Program
Ekistics (1-12) Part B, p. 159

20. Educational Research Council of America
Man and the Environment (7) Part B, p. 163

21. Engineering Concepts Curriculum Project (ECCP)
The Man Made World (11-12) Part B, p. 165

SUMMARY AND RECOMMENDATIONS

Introduction

As noted earlier in this report, information about materials and programs for environmental education is in great demand today. Schooling in the United States, though not always responsive to the demands of the society at large, does for the most part involve itself in the crises of the community and the nation. We may question whether or not the society is willing to pay the cost of altering the environment, whether or not the current high level of interest in a better environment will be sustained, and whether or not all "environmental problems" are real problems. Nevertheless, it can be said with some confidence that demands are being made upon the schools to engage children in programs dealing with environmental education. The passage of the Environmental Education Act, with increasing levels of appropriations anticipated, is a case in point. The ever-increasing number of environmental education centers throughout the United States, efforts on the part of states to create comprehensive environmental education plans, the increasing number of applications to the National Science Foundation's Curriculum Improvement and Development Section, and to the United States Office of Education, and a host of other indicators at both the state and federal level support the contention that environmental education is one of the "in things." Thus, the demand for environmental education programs is being generated at the federal level both within and without the traditional agencies associated with education, within state departments of education, by community groups, by school curriculum committees, and by teachers and students individually.

As the demand for such programs has grown, it is more and more important that administrators and teachers have ready access to available materials and sources of curriculum ideas. This report is such an effort--to inform those with needs for information about environmental education. Other sources should also be explored, particularly for current information, including the resources of the ERIC system, educational journals such as Social Education, The Instructor, and The Journal of Environmental Education, announcements put out by industry, Congressional reports, federal agencies such as the Department of Agriculture and the Department of the Interior, and service organizations such as the Sierra Clubs. To tap into these sources of information, teachers and school administrators should ask to be placed on mailing lists and should subscribe to significant

journals. The efforts to do so are slight when compared to the rewards in knowing what is available.

Summary

Programs - Curricula

Examining a list of environmental education programs might lead one, at first thought, to the conclusion that there is a large number of operational programs in the country. A moment's reflection, however, reveals this to be highly misleading. While many programs do exist, when their number is compared to the number of school districts (about 38,000) in the nation, it is clear that relatively few schools indeed have functional programs in environmental education. From this basis, it is also obvious that the number of schools operating complete K-12 programs is insignificant in relation to the total number of schools. Programs designed for the elementary levels only, exist in somewhat higher numbers, but again involve only a minor portion of the student population. Secondary students fare no better; very few programs exist for levels 7 - 12, although several schools do have units, or sometimes courses, in environmental education within their curricula.

One problem that seems to be common to all programs, not just environmental education, is, of course, the matter of financing. A number of environmental education programs, such as the Rose Tree Media School District (Pennsylvania) Outdoor Education program, have been phased out due largely to shortages of funding. This appears to be an especially serious problem in that many schools, teachers, administrators, and resource people have invested a large quantity of time and money, only to have the bulk of the investment lost at some later time for lack of sustaining funds. Thus, the problem has two major subparts, funding for program initiation and development, and, funding for maintenance of the program once it becomes operational. Solutions to these interrelated problems would appear to stem from a single source. Those programs that appear to have been most successful over time appear to be those that have had the best community support in terms of both funding and involvement. Few programs appear to have survived after outside sources of financing were removed unless there was substantial community commitment to the program.

Another problem that contributes to the short duration of some programs is the dependence of the program on too few people, often a single interested and dedicated person. When that

person leaves to take another position the program, to all intents and purposes, leaves with him. Again the more successful programs have been those that involved a substantial number of people including teachers, administrators, and citizens in the area.

A condition related to the foregoing is the almost total lack of team teaching in environmental education programs. While most centers and facility sites have groups of personnel, many of whom function effectively as teams, teachers within school systems rarely seem to operate in this manner. Whether this situation is due to the teachers' inability, or indifference, to a team approach is not clear. The need for good preservice and inservice education programs, however, seems indicated if programs are to capitalize on the less structured, informal aspects of environmental education as highly desirable and available strategies.

Perhaps a related condition is the tendency to fragmentation that appears widespread among programs. Very few environmental education programs indeed have integrated the various discipline areas to any great extent, although most include experiences from the sciences, social sciences, and, to a lesser extent, the arts and humanities. As has been noted earlier in this report, because most of the operational programs had their origins in science, outdoor, or conservation education, most of them still reflect a strong tendency toward the natural sciences in one way or another. It appears almost certain that the lack of team teaching only contributes to this condition. By teaming teachers with different discipline backgrounds and interests, the chances for successful integration of ideas and concepts that cut across subject matter areas would seem to be considerably enhanced.

Analysis of existing programs, many of them very good, leads to the somewhat surprising finding that a number of programs have very few or no materials. There appear to be two quite different causes for this. The first is the lack of funds for developing and producing materials in sufficient quantity for student use. The second, and educationally sounder, cause is the increased emphasis on processes of learning rather than on factual learning. In this case, the lack of materials is not seen as a handicap but a part of a more inquiry-oriented approach to environmental education. There is the further advantage that this strategy tends to be less fixed over time, and teachers tend to devise more of their own experiences in ways that seem appropriate for the students and the conditions.

The process approach to teaching-learning seems to be more characteristic of programs that have been operating successfully for a longer period of time. It appears that as teachers' understanding of the underlying philosophy of an environmental education program increases, they tend to be less restricted to materials for their teaching purposes. This again suggests the need for well planned teacher education programs if environmental education programs are to be successfully implemented.

Finally, a serious shortage exists in the areas of research and evaluation. While nearly every program includes some form of evaluation, usually of an anecdotal type geared toward making modifications and revisions in the program, almost no research is being done to determine the effectiveness of learning experiences. It is encouraging to note, however, that most of the evaluation being done tends to stress attitudes and values rather than cognitive outcomes, even if the results provide little in the way of "hard" data for decision making. Changes in this situation will not come about quickly nor easily. The problems associated with defining objectives in terms of attitudes and values in such a way that effective research and evaluation can be conducted, are not going to lend themselves to superficial solutions. Yet these are the same problems faced by the educational community in general, and are the problems worthy of careful and persistent effort if education is to make a lasting and worthwhile difference in our environment.

Materials

Even a cursory examination reveals that there is a large quantity of materials available that is in some way related to environmental education. Further analysis indicates, however, that many of the materials are not satisfactory, at least to some degree. At the same time, it should be noted that the materials are improving in variety and appropriateness, a trend that will hopefully continue as developers gain in experience with environmental education.

Many of the materials presently available are in a printed format. Their usefulness should not be downgraded since many teachers are particularly anxious to have access to resources of this kind, especially in the early stages of program development. In general, however, more multi-media materials should be included with the printed matter. These should include but not be limited to, games, simulation techniques, and similar items.

Few of the existing materials are truly interdisciplinary in nature. In those instances where materials do draw from more than one subject matter area, they are not often well integrated in a way that permits treating an idea as it relates to several disciplines. Development of such materials in the form of, say, a curriculum guide would constitute a major undertaking for a school system but in the long run seems superior to relying upon materials which, while multidisciplinary in a sense, are fragmented at best in their treatment of concerns as far reaching as are those included in environmental education.

A persistent problem with printed material is that of reading difficulty. Many people, concerned with the problem of readability, have examined materials in nearly every subject matter area, including things closely related to environmental education. The results seem to have remained relatively constant over time; all too often, the reading levels are inappropriate for the intended audience. This seems to be particularly critical when dealing with slow learners or with pupils who may be disadvantaged or who differ from the cultural orientation pervading the reading matter.

In many cases films may be more effective than printed materials in dealing with some aspects of environmental education. The fusing of information from more than one discipline area is often better done in this medium than it is in print. Further, while not involving students directly with the environment, films do provide for increased sense involvement and thus aid in circumventing reading difficulties. Clearly, films should be considered as alternative materials for inclusion in environmental education programs.

Most materials reviewed would need to be adapted to local and individual conditions. That is, most of the materials would not fit easily into the ongoing curricular programs within the typical elementary or secondary school. This presents two problems, not unrelated.

In the first case, teachers and administrators must make decisions about <u>where</u> within an ongoing program it is appropriate to place a particular unit dealing with a particular environmental problem. Secondly, most teachers and administrators will find that materials lack <u>particular</u> components which they feel are essential to include. The first problem can be defined as a problem of articulation and is solved when those who make curriculum decisions look closely at the conceptual scheme being followed by the teacher and logically find an appropriate place to insert the selected unit. The other problem is much more difficult to solve.

Curriculum adaption is not as difficult as curriculum development but it is nevertheless an arduous task. It requires an understanding of not only local needs--putting in those activities and ideas that are important to a particular group of students--but also a clear understanding of the subject under investigation. To alter a unit means to question the original developer's structure. If the unit has been carefully prepared, it is often a difficult job to change it without almost redoing the entire program.

Finally, for most of the materials examined evaluative data were not readily available. Closely related to this is the lack of instruments for evaluating student performance, particularly in the affective and psychomotor domains. Evaluation of the materials themselves, a difficult and time consuming task, is a necessary part of environmental education and should reflect local concerns and needs. Instruments which have already been designed for curriculum materials analysis do exist and deserve consideration. Three examples are: (1) the Curriculum Materials Analysis System developed by the Social Science Education Consortium, Inc. (SSEC), Boulder, Colorado; (2) An Approach to Selecting Among Social Studies Curricula by Alan Tom, published by the Central Midwest Regional Educational Laboratory, Inc.; and, (3) the instrument included in this report. Decision makers may want to rely on analyses already completed by others. These include, (1) the analyses found above; (2) analyses found in the Social Studies Curriculum Materials Data Book, published by the SSEC; and (3) analyses published by professional organizations such as the Association for Supervision and Curriculum Development and the National Council for the Social Studies. Also, an ERIC search for analytical documents may prove helpful.

Recommendations Related to Development and Implementation

Based on the analyses of programs and materials and the generalizations about them a number of recommendations can be made.

Programs - Curricula

We have identified three primary problems that may be encountered in developing programs or implementing new curricular ideas. First, there may be inadequate preparation on the part of teachers charged with implementation. Second, support mechanisms may not have been established which will enable successful implementation. These include support from community, administration, and colleagues. Third, it is often the case that the planned evaluation procedures are inadequate. Of course, cost, too, is always an important factor in new program implementation.

Resources to overcome the problems mentioned above may be available and visible, but still not used. Evidence suggests that a critical factor is the provision of attractive opportunities to seek and to use help. Some of the most effective solutions are: (1) conducting inservice institutes close to home which make users of innovations competent to carry out the program; (2) involving teams of colleagues from the same school building or neighborhood as well as others in the community in planning and conducting a program; peer support is considered the strongest support for utilizing resources for change; (3) planning and providing for evaluation and follow-up support; this includes the use of reliable and validated instrumentation and follow-up meetings which can be accomplished face-to-face or by telephone or tape. Often programs are accepted or rejected on the basis of total package costs. Other means of calculating costs may prove more desirable such as per pupil costing and planning materials use on a rotating basis.

Materials

1. While there are many environmental education materials that are both available and good, these represent only a small fraction of all the materials that have been produced under the heading of environmental education; there is still a need for production of many more good materials.

2. Materials are needed which balance and synthesize to a greater extent than do most existing materials the three basic elements of environmental education: natural science, social science, and values.

3. More materials are needed for early elementary grades, K-3.

4. Materials having sound content and suitable for poor readers are needed.

5. More films, games, and simulation devices need to be included in environmental programs and sources of these materials are available in the ERIC/SMEAC Resource Lists.

6. Despite the importance of slums and ghettos as a part of the environmental problem, there is a shortage of good materials for ghetto children, especially materials that will enhance the children's self-image and feelings of efficacy.

7. More materials oriented to involvement and action by students is needed. (Many programs that are exclusively or primarily science education or outdoor education are action oriented, but in many cases these do not provide social science experiences we feel are needed.)

8. Despite the generally-recognized importance of the concepts of systems, interdependence, and interaction in environmental science, they receive inadequate attention in most of the social science materials. Materials which explain and make use of these concepts are needed.

9. Although much of the concern about environmental problems centers on values and life styles thought to be inappropriate, there is a marked deficiency of materials which deal with these subjects. Materials which deal with values and life styles directly, and which incorporate the appropriate concepts in problems studies and activities undertaken, are much needed.

Implementation

Based on our analyses of effective programs several recommendations regarding the implementation of programs at the local school level are made. After identifying your program objectives you should:

1. Check to determine if your state has prepared a state environmental education plan. If it has obtain a copy to become informed regarding what is planned and determine how your school program relates to the state plan. Phone or write your state environmental education coordinator indicating you are planning a program or have a program you want to develop further and request assistance.

2. Identify an existing successful program (if one exists) similar to the one you want to develop. Obtain materials from that program and if possible employ a person from that project as a consultant to help you plan the development of your program. A person who has had experience with a successful operational program can provide you with many helpful suggestions and recommendations. Visit the program if possible.

3. Form a local Advisory Committee. This committee should include teachers, students, administrators, interested citizens and representatives of environment-related government agencies. This committee can identify needs; review materials; provide advice with respect to procedures, direction, implementation, facilities, and funding. Members of the committee can also assist in identifying and obtaining resources such as sites and facilities for school use.

4. Obtain administrative and faculty support for the program concept and cooperation regarding possible modification of the school day (blocks of time), use of school or public transportation for field activities, modification of the school campus, etc.

5. Analyze resources (facilities, sites, staff, funds available). Use as many existing sites and facilities as possible.

6. Establish a general program framework which stresses interdisciplinary concepts and local and regional environments and problems. The program should emphasize student involvement.

7. Develop instructional objectives and assessment techniques.

8. Plan the instructional program.

9. Obtain or begin development of instructional materials needed. Materials should be interdisciplinary, flexible, and provide for different instructional approaches. If your school personnel have not had experience in this type of activity, consultant help should be obtained. Curriculum development is time-consuming and expensive.

10. Provide continuous inservice help for teachers involved in the program.

11. Organize a feedback system to provide continual improvement of the program.

12. Identify a teacher-leader in each building who would coordinate environmental activities in the building by:

    a. Assisting other teachers in interpreting printed material regarding the program.

    b. Providing orientation for new instructional staff.

    c. Providing leadership for inservice workshops and conferences.

    d. Assisting other teachers in selecting and obtaining needed materials. (both print and non-print)

    e. Assisting other teachers in utilizing materials, facilities, and school sites.

    f. Assisting other teachers and administrators with the organizational arrangements needed to install the program, such as modification of the school day, team-teaching, etc.

PART B: PROGRAM AND MATERIALS INFORMATION, ANALYSIS INSTRUMENT

Included in this section are brief data sheets containing descriptive information for environmental education programs and materials that have been identified as containing promising practices or trends. In addition to these examples, there are many other units, courses, programs, and materials that persons interested in developing or implementing programs might find worthy of consideration.

The case studies included in this section are intended to provide examples of how other persons and school systems have approached the problems of program development and implementation. While no one description is likely to be appropriate for all interested parties, useful ideas may be gained for examing several cases of successful innovation.

The information sources list is intended to provide a quick reference to some agencies and organizations which are able to aid in making information available. In addition to sources, ERIC/SMEAC will provide a listing of materials available for each of the programs described in this section.

The analysis instrument is the shorter of two forms used in the review of materials and programs. Finally, some suggested learning approaches to environmental education which resulted from two regional Conferences sponsored by the National Science Teachers Association are included.

ANN ARBOR PUBLIC SCHOOLS
CONSERVATION AND OUTDOOR EDUCATION PROGRAM

Directors:	John Rosemergy William Browning
Project Address:	601 West Stadium Blvd. Ann Arbor, Michigan 48103
Grade Level:	K - 12
Subject Area:	Science, Social Studies

Overview

The Ann Arbor Public Schools Program developed from experiences in school camping and outdoor education. In 1960 a nature center was established and opened to the schools. In 1961 a program coordinator was employed to direct and expand the Outdoor Education Program, which became an Outdoor and Conservation Education Program.

Rationale and General Objectives

The K-12 program was developed to present conservation understandings in a logical sequence at the time when the learners are most receptive to the material presented. It is intended to link together subject areas, particularly science and social studies, so that both the social and scientific knowledge important in understanding and solving resource problems can be developed. Understandings developed in one grade are expanded in subsequent grades. Attitudes rather than skills are emphasized. The learner plays an active role in the learning process.

Description

The program is integrated within the existing curriculum rather than being separate. It stresses the study of community natural resources under natural conditions. A specific theme together with sub-understandings is established for each grade level. Resource sites are available for developing each grade level theme and a "Teachers' Kit" is prepared to aid the teacher in obtaining background information, preparing the class, and extending the children's learning experience following a field trip. Materials can then be selected, adapted, or developed as appropriate. The presentation consists of three phases: orientation, field trip, and follow-up. Field trip guides aid in interpreting the sites in relation to the grade level theme.

Kodachrome slides, approximately 25 per topic, were prepared for use with each of the conservation topics presented in science and social studies classes as part of the secondary phase of the program.

Description (cont'd.)

Inservice programs are conducted for both elementary and secondary school teachers. A series of grade-level field trips for elementary teachers is conducted during the school year. Additional inservice sessions provide interlevel presentations as well as providing opportunities to develop and distribute outdoor and conservation education materials. The inservice program for secondary school science and social studies teachers consists of classroom and field trip presentations as well as the preparation and distribution of additional conservation material.

Evaluative Data

A two-part evaluation was administered at the end of the first year of operation of the elementary and secondary phases of the program. The first part was an open-ended qualitative evaluation in which administrators and classroom teachers were asked to recall and record, in brief statements, those features of the program most helpful in approaching the instructional goals of the Ann Arbor School System. In the quantitative phase of the evaluation elementary teachers and secondary school science and social studies teachers were asked several questions as well as being asked to respond to a series of questions concerning the degree of helpfulness of certain aspects of the program. Data received indicated that elementary teachers as well as the secondary school science and social studies teachers reacted favorably to their experiences.

Materials and Cost

No materials are available as such. However, the development and implementation of the program are described in detail in "Integrating Conservation and Outdoor Education into the Curriculum (K-12)" by William B. Stapp, Burgess Publishing Company, Minneapolis, Minnesota, 55415, publication date 1965.

ENVIRONMENTAL EDUCATION PROGRAM
MADISON, WISCONSIN

Director:	Marvin Meissen
Project Address:	Madison Public Schools 545 West Dayton Street Madison, Wisconsin 53703
Grade Level:	K - 12
Subject Area:	Interdisciplinary

Overview

This K-12 program originated as a result of the consolidation of many concepts concerning environmental education and effective learning experiences suggested by the Madison, Wisconsin, teachers. It is intended to provide a series of experiences for students at all levels and is based on a logical conceptual framework for environmental education involving all disciplines.

Rationale and General Objectives

The rationale underlying this project may be summarized by these generalizations: 1) each teacher must be responsible for assisting pupils to gain desirable concepts in environmental education, 2) children must be made aware that our way of living depends upon how we use and conserve our natural resources, 3) conservation and environmental education must be integrated with all subjects although some areas may be taught independently as environmental concepts, and 4) concept formation in environmental education occurs when pupils develop understanding, attitudes, and interests which make concepts become positive values.

Specific objectives are: 1) to develop a systems approach to environmental education using community and school resources and 2) to develop materials and facilities for use by students in instructional and recreational activities.

Program Description

The program employs 25 naturalists with part-time responsibilities for aiding teachers with learning activities, field trips, and utilizing facilities. Both preservice and inservice education programs are

Description (cont'd.)

available for teachers desiring to use the materials. The programs include workshops, evening classes, and inservice sessions held at the local schools. Consultant services are also available locally to teachers using the materials.

Materials produced include a Guide to Environmental Education for K-6 and, for the secondary level, Ecology Action Program and World Development Program. A Science and Society course incorporates science and social studies and is designed for students in grades 10-12. A similar approach is involved in an Ecocivics course for grade 9 students. At the Middle School level, teams of science and social studies teachers utilize a geography-anthropology approach to man and his environment.

The Leopold Elementary School was designed with planned outdoor nature areas on the school grounds which are landscaped with native plants such as shrubs, trees, and woodland flowers with these areas to be used in the elementary environmental education program.

Several filmstrips and guides are available to teachers for use with activities conducted at the facilities at the Madison School Forest and the Cherokee Marsh. Other outdoor areas and curricula for local school use are being planned and developed.

Evaluative Data

In 1971 a comprehensive survey of present practice was made, involving a randomly selected sample of all levels of 1700 teachers in Madison. The information obtained will be used in future planning and scheduling. Constant feedback and input are solicited from staff and students. Records of usage are kept and analyzed.

Materials and Cost

Representative materials are:

"What is a Tour through the Madison School Forest?"
"Three Layers of Green in the Madison School Forest" (upper elementary grades) and "Madison School Forest: Clues to the Past, Signs of the Future" (middle school)--filmstrips and guide books.

(Contact ERIC/SMEAC for further information on availability and costs.)

PROJECT I-C-E (INSTRUCTION - CURRICULUM - ENVIRONMENT)

Director:	Robert J. Warpinski 1927 Main Street Green Bay, Wisconsin 54301
Project Address:	1927 Main Street Green Bay, Wisconsin 54301
Grade Level:	K-12
Subject Area:	Language Arts, Social Studies, Science

Overview

Project I-C-E was originated under Title III by the Wisconsin Department of Public Instruction, in 1969. A four-member committee was formed to assess needs and prepare a proposal: Robert Warpinski, Thomas Rhodes, Kenneth Rowan, and the Rev. Mark Schoolover. The operational proposal was effective in July 1970; teacher committees functioned from January through May 1971, and a summer institute - workshop was conducted in July 1971, for the purpose of completing guide development.

Currently, implementation activities are being conducted in pilot areas.

Rationale and General Objectives

The overall purpose of the project is "to improve instruction and curriculum, using environmental education as a vehicle." Specific objectives are as follows:

1. Development of a supplementary Environmental Education Guide, K-12, for all discipline areas;

2. develop and maintain an Environmental Education resource center;

3. community resource development and support.

Description of the Program

Supplementary Environmental Education guides in social studies, language arts, and science for grades K-6 and 7-12 have been developed, as have "Environmental Concerns Inventories" for K-4, 5-8, and 9-12. In addition, a teacher document, "Twelve Major Concept Categories - Their Rationale" has been produced. A project brochure is available free from the project.

Guides have been distributed to 53 school districts and about 100 non-public schools. An estimated 3000-plus teachers currently are using the materials. Several pilot schools have been identified.

Consultative, in-service and pre-service programs are available to teachers. The summer 1971 institute, mentioned previously, was for three weeks. In addition, teacher committees for guide development spent ten work sessions of 2-3 hours each during evenings.

Evaluation

The effectiveness of the materials has not as yet been evaluated; this is part of the present year's task.

Future Plans

Similar K-12 Environmental Education Guides are being prepared for mathematics, fine arts, physical education, home economics, industrial arts, business education, and agriculture. Among planned future activities are continued guide development and revision where necessary, continued resource center development, and emphasis on community support and resources. The Project Resource Center serving area schools, still in the early stages of development, may be visited by those interested.

Materials and Cost

Teacher's materials:
Twelve Major Concept Categories - Their Rationale

Student materials:
Supplementary Environmental Education Guides, for social studies, language arts, and science for grades K-6 and 7-12.

Environmental Concerns Inventories, for grades K-4, 5-8, and 9-12.

Complete series of 39 booklets $5.00

REGIONAL ENVIRONMENTAL EDUCATION PROGRAM,
YARMOUTH, MAINE

Director:	Wesley H. Willink
Project Address:	McCarthey Street Yarmouth, Maine 04096
Grade Level:	K - 6
Subject Area:	Environmental Education

Overview

Designed to develop a comprehensive program in environmental education, this project is modeled after the Conservation and Outdoor Education Program of the Ann Arbor, Michigan, School System. Funded from the monies available through the Title III Project, the program is designed to serve a regional area.

Rationale and General Objectives

This K-6 program focuses on developing attitudes toward study environments, their biological and physical elements and their associated environmental problems. The study environments were selected to provide for expanding both the scope and complexity of understandings to be developed. At the kindergarten-grade one level, the school environment is emphasized; at grades two and three, the neighborhood; at grades four and five, the community; at grade six, the region.

Although there is an environmental emphasis at each grade level, the study environments are treated with reference to the ways in which they relate to the other environments studied. Twelve environmental themes have been developed for those with each of the environments. Six of the themes deal with the natural environment: land, water, air, plants, animals, energy. Six concern the man-made environment: land and water development, structural design, transportation, utilities, recreation, pollution and pest control.

Description

The program involves 1) a classroom presentation by an environmental education coordinator relating to the study environment and providing a field trip orientation; 2) a field trip around the study environment with the students in small groups; and 3) follow-up investigations, environmental planning and activities with consultation provided by the coordinator when and where needed.

Description (cont'd.)

Teachers' guides are available for each of the grade levels and include the theme, teacher background information, suggested field trip interpretive technique, and suggested follow-up activities. An environmental education resource center has been established which contains additional teaching materials and special equipment for teachers and students. Consultants are also available to help teachers and students develop their school sites as outdoor learning centers. Inservice and preservice teacher education workshops are conducted for teachers interested in using the environmental education materials and program.

Evaluative Data

The materials and activities have been field tested and revised during development and implementation of the program. Data are not available at this time.

Materials and Cost

Teacher materials:

Environmental Education Program - Organization and Operation, by Dean B. Bennett, 1969. Price not known.

EASTERN MONTANA COLLEGE AND BILLINGS (MONTANA) SCHOOL DISTRICT #2
OUTDOOR AND ENVIRONMENTAL EDUCATION PROGRAM

Directors:	Erick Erickson, Principal Eastern Montana College School and Associate Professor of Education Eastern Montana College
	Wilson F. Clark, Chairman, Division of Science and Mathematics Eastern Montana College
Program Address:	Outdoor and Environmental Education Program Eastern Montana College Billings, Montana 59101
Grade Level:	6 (K-12, long-range plans)
Subject Area:	Environmental Education

Overview

The Billings Outdoor and Environmental Education Program began in 1967 as a cooperative project between Eastern Montana College and Billings School District #2. It has grown from involving only one sixth-grade classroom in 1967 to involving 33 sixth-grade classrooms in the spring of 1971. The program is somewhat unique in that during its first five years of operation it has been totally funded through a local source, the Parent Teacher Associations of the participating schools. The program is based on a well-stated concept of environmental education which views the task of the schools as one of helping to attack the "root causes"--attitudes and actions--rather than the "symptoms"--such as specific pollution problems--of environmental problems. So far, the developmental work has focused only on the sixth grade; but long range plans are projected for expanding the program through the K-12 curriculum.

Rationale and General Objectives

The 1971 progress report on the program states that their underlying philosophy is much broader than that indicated by the traditional usage of terms such as "conservation education" or "outdoor education." The environmental difficulties we face today, such as air pollution, water problems, urbanization and its consequences, and land use problems are actually symptoms resulting from much deeper "root-causes." The "root-causes" lie in our attitudes and patterns of action. There are very few areas in which we do not possess adequate technical knowledge for making "significant progress towards solution." The lack lies in our willingness to use that knowledge.

The role of the schools in helping to remedy the difficulties at the heart of man's discordant relationships with the natural environment lies in helping students to "understand their total environment,"

to "learn (through investigations of problems on their level) how to find out about the essential ingredients of problems," and to "develop the attitudes and abilities that lead to responsible citizenship exercised in actions to contribute to solving problems." The Billings program designates four specific categories of long range educational objectives to accomplish its environmental education tasks. They are to help students:

"1. to become knowledgeable concerning their total environment (biological, physical, social, cultural, economic),

2. to become skillful in how to ferret out the significant aspects of a problem or situation,

3. to become sensitive to their own role in and responsibility to developing a productive and liveable environment, and

4. to become motivated to work constructively towards the solution of environmental problems."

Description of the Program

At present the Billings program focuses on only the sixth grade, though eventually it is hoped that it will be expanded for K-12 (and even, possibly, K-16). The sixth-grade program includes several components: teacher training, camp counsellor training, backup instructor training, pre-camp preparation of sixth graders, and camp sessions for sixth graders.

The teacher training component involves five evening sessions, one Saturday session, and a two-day camp experience. These include both discussions of the program and its activities, and practice in the instructional and investigation programs to be carried on at the camp for sixth graders. College students training as camp counsellors and back-up instructors also attend these workshops. The workshops are credit granting and in the five which have been conducted since the beginning of the program, a total of 238 teachers, counsellors, and instructors have been trained.

The focal point of the program is the two-day camp experience for the sixth graders. This is preceded by in-class preparation by trained teachers in which the children become familiar with the basics of simple environmental systems. This pre-camp preparation is considered an essential ingredient of a successful camp experience. The two-day camp experience itself includes field instruction in four basic areas (ecosystems studies, geological studies, geographic studies, and plot studies) and experience in four other areas (first aid, art, recreation, and music and dramatics).

In addition to the above-mentioned components of the overall sixth-grade program, the progress report mentions several other crucial elements which should not be overlooked in replicating the program--the details of camp management. This includes such things as coordination

of personnel, establishment and enforcement of regulations and camp routines, making cabin assignments, handling clean-up and mess procedures, and acquiring the services of a camp physician.

Evaluation

The authors of the report feel that to date the program has been extremely successful, as indicated in its rapid growth and the enthusiasm of students, parents, and teachers. On the basis of feedback collected on post-workshop evaluation forms, the teacher and college student training objectives have been met. The program, however, has done little in evaluating the children's growth in understanding, sensitivity, and skill; and the progress report states that "This is an omission we hope to correct." Copies of the 1971 progress report may be obtained by writing either of the Directors.

Future Plans

As mentioned previously, the sixth-grade program is seen as only a beginning. The program's staff hopes that, in time, they will be able to pervade the entire K-12 curriculum of Billings with its environmental education objectives. The report does not specifically state what steps the staff will undertake next.

Cost

The per pupil cost of the camp sessions has decreased since the first year of operation and is now $11.07. During the five years of the program, no Federal, State, District, or College monies have been budgeted for the program. Financing was provided by several of the city's Parent Teacher Associations. Data on the sources of funds for the training workshops and for payment of the central staff of the program is not provided in the report.

TILTON SCHOOL WATER POLLUTION PROGRAM
A Curriculum Activities Guide to Water Pollution and Environmental Studies

Directors:

John T. Hershey
Head, Science Department
Germantown Academy
Fort Washington, Pennsylvania 19034

Stephen P. McLoy
Teacher of Political Theory
Tilton School
Tilton, New Hampshire 03276

Albert L. Powers
Head, Science Department
Brewster Academy
Wolfeboro, New Hampshire 03894

Alan D. Sexton
Teacher of Science
George School
Newtown, Pennsylvania 18940

Project Address:

Tilton School
Tilton, New Hampshire 03276

Publisher:

Institute for Environmental Education
2803 Scarborough Road
Cleveland Heights, Ohio 44118

Publication Date:

1971

Availability:

From publisher

Grade Level:

7-12

Subject Area:

Interdisciplinary

Overview

This program originated under the direction of Joseph H. Chadbourne, with grants from the Ford Foundation and the Federal Water Quality Administration. The curriculum guide produced was the result of the cooperative efforts of high school teachers, students, scientists, and technicians. The guide takes an action oriented approach to environmental education and draws upon several areas in the sciences and social sciences.

Rationale and General Objectives

A basic assumption underlying the program is that the student's inherent curiosity can be effectively channeled into productive activity. This "means more than what students can cover in a course; it means through the process of learning students can make a significant contribution to society at large." Thus, learning is not confined to the classroom and an important aspect of the program is to step outside or expand the classroom to encompass the life space of the student. It is in this way that theory and otherwise disjointed or irrelevant facts begin to assume importance for the student.

Description

The guide is composed of various suggested activities which students may undertake. Most of these require one and a half hours to complete, although several may require considerable longer periods of time. The activities are divided into four chapters: Hydrologic Cycle; Human Activities; Ecological Perspectives; and Social and Political Factors. Each activity contains seven parts: an introduction; questions regarding the activity; equipment; procedures; results obtained by using the study; limitations and problems encountered with the activity; and an annotated bibliography.

The seven appendices at the end of the guide include a discussion of water quality parameters, aids to implementation, suggestions regarding limitations and inconveniences, suggestions related to evaluation, a bibliography, a water pollution and environmental glossary, and comments regarding laboratory and field safety.

Evaluative Data

In addition to feedback from teachers and students using the materials, two summer research sessions were held to allow teachers and students to test ideas, methods and approaches. Case study results for each activity are included in the guide.

Materials and Cost

Teacher's Guide:

A Curriculum Activities Guide to Water Pollution and Environmental Studies, Volumes I and II $15.00

CARTERET COUNTY PUBLIC SCHOOLS
REGIONAL MARINE SCIENCE PROJECT

Director:	Will Hon
Project Address:	Rivers Island Beaufort, North Carolina 28516
Grade Level:	4 - 12
Subject Area:	Science

Overview

The Marine Science Project is designed as "an examination of a region's attitude toward a sea that embraces it physically, culturally, and economically." Developed initially under Title III, the project now receives financial support from the state of North Carolina because materials developed will be utilized on a statewide basis. Designed to cause coastal people to think about changes time and progress will bring to the coastal region, the program is aimed at the public schools, specifically grades four through twelve.

Rationale and General Objectives

The major orientation of the program is ecology. The field trip is used as the primary instructional strategy. Classroom presentations and activities are employed but are geared to the field experiences. The program involves the development of curriculum, including teaching units and field trip guides for grades four through ten and for two advanced biology courses, as well as other special publications. It also involves a program of teaching and inservice training to help develop, test and use the curriculum materials. A third program objective is the development of an education center, in the form of a facility to serve as interpretive center, demonstration area, field trip nucleus, laboratory, reference library and information center.

Description

Three week teaching units have been, or are being, prepared for grades 4-10 to supplement existing science instruction. Each unit includes student text and classroom exercises, additional notes for teachers, guides to films and reference materials, tests and answer sheets.

Each unit is designed to end with a suitable field trip. Teachers are provided with basic information and a special guide on conducting the field portion of the unit. The units are designed to fit into the existing curriculum and to replace sections of current materials.

Description (cont'd.)

The philosophy of the field trips is to set up discovery-type situations in the form of complex problems for group investigation. The class is taken to a marine community and located in an advantageous spot. The leader then guides the class in looking at the area and asking questions about what makes it function as a natural community. After several good questions have been raised, the class breaks into small groups to explore and gather data to use in answering the questions. After collecting, measuring, and observing, the groups reconvene as a total class and present their problems and discoveries and defend their explanations. The strategy used is designed to guide the students at arriving at their own explanations which, although perhaps not technically exact, are usually quite adequate.

Consultant services are available to teachers using the materials. Preservice and inservice teacher education programs are established. Workshops of two and one-half days length are conducted, as well as occasional Saturday classes. In addition, workshops are hosted for sponsoring agencies such as universities.

Evaluative Data

Evaluation is primarily based upon feedback from teachers and students. Emphasis is placed upon self directedness and self evaluation by students and involves students in designing instruments for purposes of determining attitudes and understandings.

Materials and Cost

A Tour of Mudflat Town*	gr. 2
A Day with Don at Cape Lookout Seashore	3
How Sea Animals Live	4
Living Communities of the Seashore	5
Bogue Sound Treasure Hunt	5
The Ocean and Modern Mad	6
Port: Gateway to the World Ocean	6
Salt Marsh, Sound and Sea Beach*	7
The Sea and its Boundaries*	8
The Field Approach to Coastal Ecology*	10
Marine Ecology	11-12
Experiments with Sea Water	11-12
Dune Detective	11-12
The Field Experience	all grades
Marine Science Film Catalogue	all grades
North Carolina: Our Role at the Edge of the Sea	all grades
The Major Natural Communities of the Carolina Coast	all grades
A Checklist of Molluscs of N.C.	all grades
The Regional Marine Science Project	all grades

*Teacher supplement available

MINNESOTA ENVIRONMENTAL SCIENCES FOUNDATION, INC.
ENVIRONMENTAL SCIENCE CENTER

Director:	Richard Myshak 5400 Glenwood Avenue Minneapolis, Minnesota 55422
Project Address:	Environmental Science Center 5400 Glenwood Avenue Minneapolis, Minnesota 55422
Publisher:	Minnesota Environmental Sciences Foundation, Inc. 5400 Glenwood Avenue Minneapolis, Minnesota 55422 National Wildlife Federation 1412 - 16th St., N.W. Washington, D.C. 20036
Publication Date:	1969
Availability:	From publishers
Grade Level:	K - 12
Subject Area:	Interdisciplinary

Overview

The Environmental Science Center was initially founded to develop and implement programs in environmental education aimed at maintaining an environmental balance. The Center was funded, in 1967, with a three-year grant from the U. S. Office of Education under Title III of the Elementary-Secondary Education Act of 1965. The program at the Center ranges across grade levels K - 12 and includes vocational and adult education.

Rationale and General Objectives

The overall purpose of the program is to improve the quantity and quality of education pertaining to man's relation to his environment. Specific objectives are to: 1) develop and test model staff development programs in the environmental sciences for elementary and secondary school teachers and administrators, college instructors, youth and adult organization leaders; 2) develop and test inquiry-oriented, interdisciplinary, instructional materials and programs based upon socioecological interrelationships; and 3) assist schools and other agencies to identify, develop, and utilize available natural areas and other community resources as environmental laboratories, i.e., the everywhere classroom.

Description

A series of 43 activities appropriate for use with several grades in the elementary school have been developed. Most of these activities are designed to promote independent study by the pupils and tend to be science oriented. No sequence of activities is required, permitting teachers to select and order activities as appropriate. The activities are aimed at effecting changes in the cognitive, affective, and psychomotor domains. Objectives are not specified for all activities. Many of the activities are designed for use in an outdoor or community setting, while others may be used in a classroom or indoor laboratory. Additional materials are in planning and developmental stages for all levels K - 12 and are intended to reflect an environmental issue-action orientation.

Field trips are available as part of the program with persons from the eleven member staff at the Center aiding in planning and utilizing site facilities for learning activities. Consultants are provided to teachers and other persons using the materials and to schools to conduct site surveys for developing outdoor laboratories.

Preservice and inservice education programs are conducted. These include evening classes, workshops, and summer institutes.

Evaluative Data

A semantic differential test, given under preimposed course conditions, was used to measure changes in attitude toward environmental education and toward an inquiry strategy for teaching. Results are available from the Center.

An implementation survey was conducted to determine how many inservice participants had actually used Center curriculum materials and which pieces were used most frequently. Over 75% of all course participants have implemented an average of two pieces of curriculum materials.

An opinion survey was made to determine participant acceptance of the workshop environment and its interpersonal elements. Respondents showed a strong tendency to agree with the positive statements listed in a group of positively and negatively stated items, indicating that the workshop atmosphere and interpersonal elements were favorably received.

Materials and Cost

Population Perspectives	Gr. 7-12	$0.50
Salts	5-12	.50
Shadows*	1-6	1.00
Color and Change	K-2	1.00
Soil - Water Holding Capacity	1-6	.50
Auto, Environment and Values	7-12	.50

Materials and Cost (cont'd.)

Soil - Acidity/Alkalinity	Gr. K-6	$0.50
Minnows and Models	4-6	1.00
Stream Analysis	5-12	1.00
Plant Puzzles	1-6	1.00
Transect Activities I	4-9	1.00
Population Variation		1.00
Transect Activities II	4-9	.50
Nature's Art	3-6	1.00
School Site Development		1.00
Brine Shrimp	1-5	1.00
The Cemetery as a Social Document	7-12	1.00
Variation within a Species*	4-8	1.00
Vacant Lot Studies*	5-9	1.50
Population Growth	6-12	1.00
Stream Profiles	4-9	1.00
Button Bags	3-9	1.00
Contour Mapping	4-9	1.00
Tree Watching	K-6	1.00
Nature Hunt	K-6, Special Ed.	1.00
Population Sampling	3-8	.50
Habitat Study - Transect Study		1.00
Habitat Study	3-7	
Transect Study	5-9	
Give Earth a Chance	5-8	4.00
Water Quality	6-12	1.00
Liquids and More Liquids	2-6	.50
Photography for Kids	4-8	1.00
Field Activities Package		1.00
Tubs of Tiles	1-2	.50
Snow and Ice*	1-6	1.50
Where Are the Animals	3-8	1.00
Succession in Micro-Aquaria	5-9	.50
Outdoor Activities Collection	1-12	2.00
Managing Natural Resources**	7-12	refer to #38 in catalogue
Plants in the Classroom*	3-6	1.50
Micro-Climates	3-9	.50
Wind*	3-6	1.50
Man's Habitat - The City	4-9	1.00
Squirrels, Acorns and Oak Trees	2-6	1.00

*Available from National Wildlife Federation

** Available from Documents Section, Room 140, Centennial Office Building, St. Paul, Minnesota 55101

CONSERVATION AND ENVIRONMENTAL
STUDIES CENTER, INC.

Director:	V. Eugene Vivian
Project Address:	Box 2230, R. D. 2 Browns Mills, New Jersey 08015
Grade Level:	Elementary and Junior High School
Subject Area:	Science, Social Studies, Outdoor Education, Mathematics, Language Arts, Environmental Education

Overview

The Conservation and Environmental Studies Center, Inc. has grown into a regional center for southern New Jersey which provides week-long resident programs for elementary and junior high school students with their teachers, high school student assistants, and college student internes. Most materials developed have been for use with teachers and students in these week-long terms at the center. A few have been developed for use in the regular school situation before or after the resident program at the Center.

Rationale and General Objectives

The approach to environmental education is intended to "create a concern for all environments that leads to a commitment to preserve optimum environments and improve less desirable environments." Specific objectives of the program are to: 1. develop comprehensive teacher guides and children's tests and activity materials for environmental education; 2. train teachers to use environmental education curriculum materials and develop their own curriculum materials for environmental education; and, 3. conduct exemplary programs for teachers and children in environmental education.

Program Description

There are three major aspects of the program involving the Center with schools. On-Site Programs are conducted with scheduled visits by Center personnel to participating school districts to develop programs within the existing curriculum. Classrooms, school grounds, and areas adjacent to the school property are used. The emphasis is on training teachers rather than on direct classroom teaching.

Day-Trip Environmental Education Programs are designed for classes having a special purpose for visiting the Pine Barrens. These field

trips are to reflect an ongoing curricular concern rather than a casual visit, and which require a visit to a particular location to witness a seasonal change, observe a unique phenomenon, or contrast the area with areas previously studies.

Resident Environmental Education Programs are conducted at the project center and are usually five days in duration. Joint planning by Center personnel and teachers takes place prior to arrival at the center. Techniques for evaluation of objectives in the cognitive, affective, and psychomotor domains are also developed during the planning stage.

Teacher education programs, both preservice and inservice, are conducted as part of the program. This includes workshops of 2-3 days, summer institutes, evening classes for graduate credit at Glassboro State College, a course on Science and Environment, and the Headstart Supplementary Training Program. In addition, materials for educators to use in preparing teachers are available and consultant services are provided.

Much of the material developed by CESC understandably concentrates on the local environment of South Central New Jersey: history, ecology, geology and soil, agriculture and forestry, weather, hydrology. Others deal with perception, language arts, arithmetic and geometry through field experience. Still others could be used in urban settings almost anywhere.

Of the sixteen curriculum areas in the Teachers Workshop Handbook, the following fall within the environmental education scope:

Agriculture in the Pine Barren
Animals in the Pine Barren
Environmental Concerns
Exploring an Historic Site
Outdoor Observation Experiences
Pine Barrens Ecology
Public Lands, Development and Protection
Water Quality Study

While they include little analysis of problems, teachers may find the following separate teacher's guides useful:

Founding a New Settlement: Survival Skills
Inviting Involvement with History
The World Around Them: Environmental Education in the Urban Environment
A Cleaner World: Litter and Solid Waste Disposal
Main Street, U.S.A.

Evaluative Data

Direct feedback evaluation of an anecdotal kind is requested from teachers and students who use the facilities. Modifications in the program and materials are made on this basis.

Materials and Cost

Teachers Workshop Handbook
Teacher's Guides (see Description for specific titles.)

LAND BETWEEN THE LAKES
CONSERVATION EDUCATION CENTER

Director: John Paulk

Project Address: P. O. Box 27
Golden Pond, Kentucky 42231

Grade Level: 4 - 9

Subject Area: Conservation, Outdoor Education

Overview

Land Between the Lakes, a 170,000 acre strip of land between Kentucky Lake and Lake Barkley in western Kentucky and Tennessee, was developed as a national demonstration center in outdoor recreation and conservation education in 1963 under the guidance of the Tennessee Valley Authority. A major portion of the education program is concentrated in the Youth Station, a major facility within the Conservation Education Center.

Rationale and General Objectives

The basic purpose of the Youth Station is to introduce resident outdoor and conservation education programming to as many educators as possible. The Center staff aids schools in developing their own programs in an attempt to include the natural and cultural environment into the existing curriculum through the utilization of natural phenomena and the outdoor setting.

The following basic objectives have been established for the Youth Center:

1. To introduce outdoor and conservation education to school systems as good education that is a part of the total curriculum and is integrated with all areas of the on-going program.
2. To demonstrate that an outdoor education resident facility utilized as a part of the learner's total education provides learning and living experiences which enable students to develop better academic success and attitudes toward life.
3. To promote an attitude of environmental awareness and develop a sense of responsibility and interest toward our environment and natural resources.
4. To provide a setting and atmosphere for assisting the professional educator in achieving the following basic objectives with students in his charge: self-realization, human relationship, economic efficiency and civic responsibility.

Rationale and General Objectives (cont'd.)

5. To provide a facility where school children, generally in grades 4 through 9, and their leaders may reside and participate in their own outdoor education programs and projects.

Description

Because the major emphasis is upon teacher education, relatively low emphasis is placed upon the development of materials by the Center. Consultant services and workshops are made available to teachers to enable them to plan and develop learning activities that fit their own needs prior to bringing their students to the site.

Summer workshops, designed to show how the outdoors can be incorporated into the curriculum, provide for inservice education. In addition, college and university students learn methods and techniques for outdoor teaching in a natural setting.

Some descriptive, supplementary materials are available for teacher use when classes are brought to the Land Between the Lakes.

Evaluative Data

Information concerning the utilization of the Youth Station by elementary and secondary schools, college and university groups, non-school groups and observers, and for teacher workshops is contained in a publication, "Report on the Youth Station April 1966 - December 1969," by the Conservation Education Section of the Tennessee Valley Authority.

Materials and Cost

Supplementary materials

Field Guide to Mammals of Land Between the Lakes
Field Guide to Wading and Upland-Game Birds of Land Between the Lakes
Maps are for Fun! Knowledge!
Bald Eagles in Land Between the Lakes
A Checklist of Birds of Land Between the Lakes
Long Creek Trail
Woodland Walk

Tennessee Valley Authority, Golden Pond, Kentucky

PADUCAH INDEPENDENT SCHOOLS
ENVIRONMENTAL EDUCATION PROGRAM

Director:	James M. Major 1000 Clark Street Paducah, Kentucky 42001
Program Address:	Paducah Public Schools 10th and Clark Streets Paducah, Kentucky 42001
Grade Level:	1 - 12
Subject Area:	Interdisciplinary

Overview

This program is intended for students in grades 1-12 and the activities were developed specifically for the Youth Station Facilities at Land Between the Lakes, Kentucky but with a view toward making them adaptable for other locations and programs. The materials were developed through the cooperation of administrators, teachers, and staff of the Paducah Independent Schools and personnel at Land Between the Lakes.

Rationale and General Objectives

The environmental education program is intended to meet the need for a general education effort to produce in future generations interpretations of the profound relationships between resources and ecological balances, regional development, public policy, economics, and human welfare. General objectives for the program are delineated in the areas of knowledge, skills, attitudes, and process. Also included are student goals of self-realization, human relationships, economic efficiency, and civic responsibility. In addition, school objectives are defined as are objectives for specific areas of study, including life science, earth science, astronomy, social science, conservation, pollution, and language arts.

Description

Materials produced include teachers' guides for suggested field activities to be conducted at the Youth Station Facilities. The descriptions include objectives (with most specified in performance terms) materials to be used, and suggestions for instruction. The activities require direct involvement of students with the environment and most are relatively open, tending toward an inquiry orientation. Several of the activities are related to art, social studies, and mathematics. The majority reflect a science orientation.

Description (cont'd.)

Background information on the Land Between the Lakes area is provided for teachers along with details regarding available facilities and procedures to be followed. Techniques are described to aid teachers in developing behavioral or performance objectives for learning activities and suggestions are made for evaluation procedures utilizing these objectives.

Evaluative Data

Informal evaluation activities consisting primarily of anecdotal reports from classroom teachers who have taken their classes to the Land Between the Lakes are reported in a publication entitled "Environmental Education Objectives and Field Activities" by James M. Major and Charles A. Cissell.

Materials and Cost

.Teacher's Guide
Environmental Education Objectives and Field Activities, Fourth Edition, 1971, 366 pp. $5.00
(available from the Paducah Public Schools)

NATIONAL PARK SERVICE
NATIONAL ENVIRONMENTAL EDUCATION DEVELOPMENT (NEED)

Director:	George B. Hartzog
Program Address:	National Park Service U. S. Department of the Interior Washington, D.C. 20240
Grade Level:	K-12
Subject Area:	Interdisciplinary

Overview

The NEED program, funded by the National Park Foundation, is concerned with the development of teaching materials and a program of studies and experiences for levels K-12 to help enrich the existing curricula with environmental concepts. The materials are intended to help teachers develop ways to teach about the environment in every subject area.

Rationale and General Objectives

The goal of the NEED program is to foster an appreciative and critical environmental awareness in youth, through an understanding of natural and social processes illustrated in National Park areas. Further, the program aims to increase the will and capacity to improve the environment; to aid youth in developing an environmental ethic.

Program Description

The program is interdisciplinary in nature and based on the premise that environmental awareness requires outdoor implementation of classroom lessons. Organization of the program is developed around five major ideas, variety and similarities, patterns, interaction and interdependence, continuity and change, and evolution and adaptation. These form the strands that run through lessons in mathematics, art, social studies, communications, and science.

There are three phases to the program. Phase I, for K-6, emphasizes awareness, focusing on understanding and appreciating the natural and cultural environment. Phase II, for grades 7-8, is the technical phase and focuses on man's use and abuse of water, land, and other resources. Phase III, for high school students, is the ethical phase and stresses the need for environmental management and planning-- an environmental ethic.

Program Description (cont'd)

As the program was originally conceived, the intention was to get inner city children out into a natural study area for an entire school week. As the program has developed, it has expanded beyond this beginning to include pupils from all areas and backgrounds. Throughout the program students may go on local field trips to supplement their classroom studies, and sometime during the fifth or sixth grade the children spend five days with their teachers in some natural area. While some NEED sites are in national parks, not all are. The NEED program is closely related to the National Environmental Study Area program (NESA) also developed by the National Park Service.

Evaluative Data

The program has been field tested on a nationwide basis for approximately three years. While no data are currently available, it has been reported that students show evidence of increased personal awareness, sharpened sense of the environment, and of the interweaving of self and world.

Location of Sites

For further information on the locations of sites, write:

Director
National Park Service
U. S. Department of the
Interior
Washington, D.C. 20240

NORTHEAST REGION
National Park Service
143 South Third Street
Philadelphia, Pennsylvania 19106

NATIONAL CAPITAL PARKS
National Park Service
1100 Ohio Drive, S.W.
Washington, D.C. 20242

SOUTHEAST REGION
National Park Service
Federal Building
P.O. Box 10008
Richmond, Virginia 23229

MIDWEST REGION
National Park Service
1709 Jackson Street
Omaha, Nebraska 68102

SOUTHWEST REGION
National Park Service
P.O. Box 728
Santa Fe, New Mexico 87501

WESTERN REGION
National Park Service
P.O. Box 36063
San Francisco, California 94102

NORTHWEST REGION
National Park Service
Room 931
4th and Pike Building
Seattle, Washington 98101

Materials and Cost

A general guide book to help schools establish and operate such programs is:

Man and His Environment, An Introduction to Using Environmental Study Areas, National Education Association, 1201 Sixteenth Street, N.W., Washington, D.C. 20036 $1.75

The following materials are available from:
Silver Burdett Publishers
4200 North Industrial Boulevard
Indianapolis, Indiana 46254

Grades 5 - 6 - NEED Project
Teacher's booklet--Code 46-130-56
Student's booklet--Code 46-100-56

Grades 5 - 6 - NEED Response Booklet
Student's booklet--Code 46-120-56

Grades 4 - 9 - NEED - Environmental Education
Teacher's booklet--Code 46-190-00

NATIONAL PARK SERVICE
NATIONAL ENVIRONMENTAL STUDY AREA (NESA) PROGRAM

Director:	George B. Hartzog
Program Address:	National Park Service U.S. Department of the Interior Washington, D.C. 20240
Grade Level:	K-12
Subject Area:	Interdisciplinary

Overview

The National Environmental Study Area (NESA) program is a cooperative undertaking of the bureaus within the Department of the Interior, the Department of Health, Education, and Welfare's Office of Education, the National Education Association, and local education communities, using guide materials developed by the National Park Service and the existing curricula of participating schools.

Rationale and General Objectives

The NESA's are intended to provide a different kind of learning experience making use of both the natural and cultural worlds, as they make up the study areas. The areas, along with the guide materials and regular school experiences are intended to help the students relate to their world by:

1. Introducing them to their total environment--cultural and natural, past and present.

2. Developing in them an understanding of how man is using his resources.

3. Equipping them to be responsible and active members of the world they are shaping and being shaped by.

Program Description

The Park Service has designated areas throughout the Park System and on other lands as environmental study areas for use by local school systems. Some of these sites are primarily natural and exemplify the elements and forces and balances in nature-- out of which man is made and out of which he builds his cities and society and culture. Other sites are primarily cultural, a rise of ground that formed a logical battle site, or a landing area along a river that developed into a gateway

Materials and Cost

A general guide book to help schools establish and operate such programs is:

Man and His Environment, An Introduction to Using Environmental Study Areas, National Education Association, 1201 Sixteenth Street, N.W., Washington, D.C. 20036 $1.75

into some interior region. In these places a youngster learns to recognize how the environment has affected man's development and how man, in turn, has affected the environment.

The program is developed around five environmental strands: interaction and interdependence, variety and similarity, patterns, change and continuity, and, adaptation and evolution. The NESA guidelines, developed by the National Park Service and the National Education Association, provide a framework within which the local areas can adapt to its own needs. Teacher workshops are set up through the sponsoring agencies and carried out with the cooperation of the local school systems. At the workshops, teachers are introduced to the NESA, provided resource materials on the areas, and given suggestions on ways of adapting the experience into the entire range of classroom activities. Emphasis is placed on interpretation of the regular curriculum through the five environmental strands.

Evaluative Data

Approximately three years of field testing have been done, including teachers and students. Revisions and modifications in the programs have been made based on these tests.

Location of Sites

For further information on the locations of sites, write:

Director
National Park Service
U. S. Department of the
Interior
Washington, D.C. 20240

NORTHEAST REGION
National Park Service
143 South Third Street
Philadelphia, Pennsylvania 19106

NATIONAL CAPITAL PARKS
National Park Service
1100 Ohio Drive, S.W.
Washington, D.C. 20242

SOUTHEAST REGION
National Park Service
Federal Building
P.O. Box 10008
Richmond, Virginia 23229

MIDWEST REGION
National Park Service
1709 Jackson Street
Omaha, Nebraska 68102

SOUTHWEST REGION
National Park Service
P.O. Box 728
Santa Fe, New Mexico 87501

WESTERN REGION
National Park Service
P.O. Box 36063
San Francisco, California 94102

NORTHWEST REGION
National Park Service
Room 931
4th and Pike Building
Seattle, Washington 98101

CASE STUDIES

The following case studies describe procedures followed by various persons in their approaches to the problems associated with developing and implementing environmental education programs. No single description is apt to be totally sufficient or appropriate to meet the needs of everyone concerned with program innovation. However, by selecting from among the various alternatives, some ideas should be available for dealing with most of the major problems encountered.

If at all possible, a site visit to an operational program is highly worthwhile. A far better understanding can be gained on-site than from simply reading descriptive information. This is particularly true for those programs that are highly process oriented and have relatively few materials.

Site visits to the described programs are permitted, and staff members will endeavor to aid visitors in finding solutions to problems. Advance arrangements should, of course, be made.

CASE STUDY*

Ann Arbor Public Schools
Ann Arbor, Michigan

ORIGINATION

In 1961 William B. Stapp accepted the position of Consultant in Outdoor and Conservation Education for the Ann Arbor Public Schools and began to develop a K-12 program in conservation education to be integrated into the existing school curriculum. Ann Arbor was one of the pioneer school systems in school camping. As early as 1933, junior high school teachers were encouraged to integrate field trip experiences into their courses of study. During the 1959-60 school year the local Audubon Society created a nature center on a private parcel of land 9 miles from Ann Arbor. The interest created when one elementary school served as a pilot for bringing classes on guided field trips through this center served as the impetus to open the center to all schools in the system the following year. In 1961 the local Aubudon Society suggested that the Ann Arbor Board of Education employ a coordinator to direct and expand the outdoor education program initiated at the nature center. This chain of events resulted in the K-12 program which was ultimately developed.

UNDERLYING RATIONALE

After surveying publications by widely known authorities and writers in the field of conservation education, the program coordinator identified nine principles to be used in the development of a program in outdoor and conservation education.

1. The Conservation Program should span the curriculum, kindergarten through the twelfth grade, so that conservation understandings can be presented in a logical sequence at the time that the learner is most receptive to the material presented. Isolating conservation as a single course limits the scope of the program and the number of students exposed to conservation understandings.
2. The Conservation Program (K-12) should provide continuity and progression in the program, so that the understandings developed in one grade will grow and be expanded in subsequent grades.
3. The conservation program (K-12) should link the subject areas that relate most closely to conservation, especially science and social studies, so that both the social and scientific knowledge important in understanding and solving resource problems are properly developed.

*Material in this case study was adapted from Integrating Conservation and Outdoor Education into the Curriculum (K-12), William B. Stapp, Burgess Publishing Company, Minneapolis, Minnesota, 1965.

4. The conservation program (K-12) should be integrated and correlated with the existing curriculum in a manner that will enhance the instructional goals of the school system.
5. The conservation program should give the learner an opportunity to study some of our community natural resources under natural conditions. This provides certain learning experiences that can not be duplicated within the school building.
6. The conservation program should stress attitudes and not vocational skills. The most important conservation impact that most of our urban children will have upon our natural resources will be through their action as community citizens.
7. The conservation program should emphasize local resource problems so that our future community citizens will have the incentive and tools to cope effectively with our current and future resource problems. However, the conservation program should not neglect regional, national, and international resource problems.
8. The conservation program should be handled in such a manner that the learner plays an active role in the learning process. The learner develops attitudes through personal experiences and thinking and not through the presentation of predigested conclusions.
9. The conservation program should provide a comprehensive inservice training program for teachers which would operate throughout the school year and would be directed at helping teachers increase their understandings, interest, awareness, and teaching skills in conservation.

PERSONNEL

The planning and developmental stages of the program were handled by the program coordinator. He developed the elementary (K-6) phase of the program in nine major stages, as follows:

1. Examined teachers' guides and textbooks in science and social studies for each of the elementary grade levels to become familiar with the purpose, objectives, and general scope and sequence of the programs already existing.
2. Met with the science coordinator and an elementary planning committee (elementary principal and representatives from the lower and upper elementary grades) to work out the most effective plan for integrating the outdoor and conservation education program into the existing curriculum.

3. Examined science and social studies curriculum guides for each of the elementary grades in order to develop themes, understandings, and subunderstandings appropriate for each grade level. Each grade level theme was supported by six understandings with subunderstandings also developed to provide desired continuity and progression in the total program.
4. Developed the structure of the program related to field work, teacher orientation, alternatives in case of inclement weather, and follow-up activities.
5. Located a resource site appropriate for the development of each grade level theme.
6. Contacted, oriented, and trained a group of assistant field trip guides. Guides came from the community and the university student population.
7. Oriented the secretaries in the Office of Instruction concerning orientation and field trip appointments and the confirmation of appointments.
8. Developed charts to help prepare the learner for the field trip experience. These charts are used in a classroom presentation prior to the field trip.
9. Prepared materials and developed an inservice program to orient the teachers for the field trip to the resource site and follow-up activities.

The development of the secondary phase of the program followed a similar procedure and was also divided into nine major stages. In the fourth major stage, the program coordinator met with junior and senior high school science teachers to discuss ways in which he could provide consultant help to them. The science teachers were asked to list conservation topics for which they would like to have assistance in integrating into their courses. A similar meeting was held, in stage six, with the social studies teachers.

In stages seven and eight, subject material on the conservation topics requested by teachers was developed and mimeographed for distribution to the teachers. In addition a series of approximately 25 Kodachrome slides was developed for use with the classroom presentation of the topics. The ninth stage was the development of an inservice program for the teachers.

RESOURCES

The nature center area was contributed by the local Aubudon Society. Two of the resource sites chosen for the elementary phase of the program were controlled by the Board of Education. Additional sites were identified with the help of the district forester and local soil conservation service.

FINANCING

Financing was apparently handled by the Ann Arbor Board of Education with contributions such as the land for the nature center being made available to the schools through interested community and citizen groups.

MATERIALS

No materials were developed for publication other than the book Integrating Conservation and Outdoor Education into the Curriculum (K-12) by William B. Stapp.

EVALUATION

An evaluation of the program was made at the end of the first year of operation of the elementary and secondary phases of the program. The evaluation consisted of two parts: (1) an open-end qualitative evaluation in which administrators and classroom teachers were asked to recall and record, in brief statements, those features of the program most helpful in approaching the instructional goals of the Ann Arbor School System; and (2) a quantitative evaluation in which teachers (elementary and secondary) were asked to respond to a series of questions concerning the degree of helpfulness of certain aspects of the program.

Teachers were asked to respond to three additional questions: (1) one concerned the development of new kinds of attitudes and interests developed in the students as a result of the program, (2) a second related to ways the program helped the individual classroom teacher, and (3) one requested suggestions for improving the conservation program.

Analysis of the qualitative evaluation revealed that the program was very helpful in (1) approaching the instructional goals of the Ann Arbor Public School System, (2) helping to develop desirable interests, attitudes, and appreciations at all grade levels, (3) helping to develop desirable conservation understandings and concepts at all grade levels, and (4) helping teachers to be more effective in the presentation of conservation material.

Analysis of the quantitative evaluation revealed that:

1. Elementary teachers:
   a. rated the program high in approaching their instructional goals.
   b. rated the program high in the degree of helpfulness that the outdoor and conservation education written material was in approaching their instructional goals.

c. rated the program high in the degree of helpfulness the orientation period was in preparing their students for the field trip.
d. rated the program high in the degree of helpfulness the presentation on the school bus was in preparing their students for the field trip.
e. rated the program high in the degree of helpfulness the continuing activities were in extending the interest and attitude of their students.
f. (for kindergarten) rated the program high in establishing a "friendly" relationship between the child and the living world.
g. (for first grade) rated the program high in increasing the child's awareness of his environment.
h. (for second grade) rated the program high in increasing the child's understanding of the interrelationship between plants, animals, and soil.
i. (for third grade) rated the program high in increasing the child's understanding of the interrelationship between aquatic plants and animals and their nonliving environment.
j. (for fourth grade) rated the program high in increasing the child's understanding and appreciation of the interrelationship and interdependence between plants, animals, soil, and water.
k. (for fifth grade) rated the program high in increasing the student's understanding of man's impact on the environment.
l. (for sixth grade) rated the program high in increasing the student's understanding of how land management practices in a watershed influence the welfare of all people living in the watershed.

2. Secondary science and social studies teachers:
a. rated the program high in approaching their instructional goals.
b. rated the program high in the degree of helpfulness the conservation education written material was in approaching the instructional goals of their course.
c. rated the program high in the degree of helpfulness the program coordinator's classroom presentation was in approaching their instructional goals.

TEACHER EDUCATION

The program of inservice education that accompanies the Outdoor and Conservation Education Program of the Ann Arbor Schools operates throughout the school year. It is aimed at helping teachers increase their understandings, interest, awareness, and teaching skills. It consists of providing the teachers with an "Outdoor and Conservation Education Program Guide" containing the philosophy, organization, and operation of the program and informing the teachers of the procedure for making a class appointment.

Teachers' kits are prepared for each grade level. These kits are sent to a classroom teacher one week prior to the class orientation session for the field trip. The kit contains material designed to (1) broaden the teacher's background, (2) prepare the class for the program, and (3) extend the child's learning experience following the field trip.

During the school year a series of grade-level field trips are conducted to orient the elementary teachers to the resource sites. Additional inservice training sessions are also provided in the form of interlevel presentations and in the preparation and distribution of outdoor and conservation education material.

The inservice program for secondary school science and social studies teachers consists of classroom and field trip presentations and in the preparation and distribution of additional conservation material.

CASE STUDY

ENVIRONMENTAL EDUCATION PROGRAM
MADISON, WISCONSIN

The program presently operating originated as a result of the consolidation of many concepts concerning environmental education and effective learning experiences suggested by Madison teachers. More than 500 Madison staff members gave their aid and counsel in the preparation of present guides and program. Help was also derived from curriculum materials previously prepared by the Madison Public Schools and from current trends expressed in textbooks, courses of studies, manuals, and professional literature. The Wisconsin Department of Natural Resources and the Wisconsin State Department of Public Instruction also were responsible for help and counsel in initiating the facets of the present program. Mr. Paul Olson, elementary principal within the system, has given excellent leadership over many years to conservation and environmental education in the Madison schools. He has worked diligently with the faculty and the Board of Education committees in this area, giving special attention to the development of the Madison School Forest.

RATIONALE

The underlying rationale for the program can best be represented from worksheets prepared by the teachers expressing the following generalizations

1. Each teacher is responsible for assisting pupils to gain desirable concepts in environmental education.

2. Children must be made aware that our way of living depends upon how we use and conserve our natural resources.

3. Conservation and environmental education must be integrated with all subjects yet with some areas taught independently as environmental concepts.

4. Concept formation in environmental education occurs when pupils develop understanding, attitudes, and interests which make concepts become positive values.

5. Many of the learning activity concepts suggested in the program are further developed by using Madison School Forest facilities and Cherokee Outdoor Education facilities for practical experiences.

PERSONNEL

At the elementary level in the developmental stages, input was solicited from 500 elementary teachers to prepare a Guide to Environmental Education: Conservation of Natural Resources. A summer committee worked to write this guide which was completed in 1970 for use at the elementary level. Teachers, administrators, and Department of Public Instruction personnel collaborated at all levels, elementary, middle and senior high school, to develop course structures and implementation strategies.

At the high school level social studies and science teachers were released from teaching responsibilities during the school year for development of program. Teachers of these two disciplines along with interested students from these high schools met under the auspices of the Department of Curriculum Development to plan course content, concept development, methodology, and implementation strategies. As a result of these efforts, courses in the senior high school have been partially implemented for eco-civics and ecology action programs.

At the middle school level, a similar committee composed of social studies and science personnel again looked at interdisciplining the curriculum at the 7th grade level using a geography and environmental thrust. This program is continually developing and at presently anticipated rates should be completely implemented within two years. A committee for the elementary program and an environmental education committee has met regularly to review materials and discuss program. These committees continue to function.

Maintenance of the program is aided by provision for 28 part-time naturalists, a Director of the Cherokee Outdoor Education Area, a Director of the Madison School Forest and Curriculum Department support. It is anticipated that additional administrative personnel will be added in the near future.

PROGRAM

The pleasure of responding to a natural environment and the growing awareness and understanding fostered by teacher and naturalist are made available to thousands of Madison children each year through the School Forest program. Naturalists and buses provided by the Board of Education are just one part of the program, which has been continually growing since its inception a decade ago. At that time, a gift of land was made

to the Madison Board of Education - 160 acres of virtually undisturbed oak woods. (Since that time an additional gift has increased the area to nearly 300 acres). From the beginning, the School Forest program has been guided with vision and expertise by its present director, Mr. Paul Olson, principal of a local elementary school and long-time active conservationist.

Work-Learn Program

Committed to the idea that the best place to teach conservation is outdoors, Mr. Olson organized a summer "Work-Learn" program for ninth grade boys. These boys ("too old to play all summer but too young to get jobs") do stream improvement work on area trout streams - fencing, stream structures to direct flow, bank stabilization, etc. This work involved cooperation with the farmer owners and the Wisconsin Department of Natural Resources. Forestry practices were added to these experiences. The new gift of land provided an excellent opportunity, and approximately 80 acres of the Forest were set aside for this purpose. Here, closely supervised by teachers recruited for summer work, the boys learn some basic forestry principles. The lumber harvested is used by the boys to build structures needed for the other facets of the growing School Forest program. As each part of the program has developed, support from the Board of Education, plus occasional additional funds from local businessmen have been obtained.

School Camping

In a hilltop area set aside for school camping the Work-Learn boys have built a shelter house, food preparation and utility building, four insulated and heated cabins to accommodate 15 to 20 cots each, and a large nature center. The buildings are located along the edge of a large mowed field suitable for active sports. Here in spring and fall two classes at a time, usually 5th or 6th grade, can spend one or two nights. Each camping group plans its own schedule - including learning expectations, recreational activities, campfire programs, food, individual chores, etc. Naturalists are provided for approximately three hours each afternoon, two per class, to lead exploratory hikes and special studies of such topics as mammals, birds, or geology. The camping experience has been very successful, and reservations fill the entire season well in advance.

Adjacent to the campground a picturesque rocky area is available for family picnicking, with picnic tables provided by the Work-Learn boys. The camping, picnicking, and forestry areas are areas modified by man's use; for the rest of the Forest man's role is limited to that of preserver and observer.

Interpretive Program

To launch an interpretive program for all aged children, the aid of Dr. James Zimmerman, outstanding naturalist and teacher, was enlisted. Dr. Zimmerman has been the key person in training the necessary naturalists and increasing the environmental awareness of the teachers. Specifically, Dr. Zimmerman has given each year:

1. An evening course in ecology entitled, "Reading the Landscape" held once a week for twelve weeks plus field trips. Made available to the public through the Madison Area Technical College, this course has reached hundreds of people in the area. To encourage teachers to participate, salary advancement credits are given to those completing the course. The course has also provided an opportunity to recruit potential naturalist guides from the ranks of homemakers with a variety of educational backgrounds. (Graduate students at the University of Wisconsin also serve as naturalists, and more recently high school biology honor students have worked with the camping groups).

2. A week long School Forest Institute in June which is a concentrated outdoor learning experience for teachers. The enrollment in this course has increased so much that several experienced guides now assist with the instruction. The course is sponsored by the Board of Education. Fees charged pay for the instructors' salaries. Advancement credits are given.

3. Training for naturalist guides was originally accomplished on an information on-the-trail basis. The need for guides for various outdoor programs in the Madison area has increased so tremendously that a cooperative training program has been set up with the University of Wisconsin Arboretum. (The School Forest presently employs twelve part-time guides). The once-weekly morning sessions include lectures and lab-type activities

conducted by Dr. Zimmerman, occasional guest speakers from the University faculty, seminar studies prepared and presented by the guides themselves, outdoor study of various natural communities, and field trips to places of special ecological interest. Mrs. Rosemary Fleming, Dane County Naturalist, has assisted in coordinating this training.

Instructional Materials

High quality materials have been developed to aid the classroom teacher. Examples of these include:

1. A comprehensive 150 page book on the School Forest written by Mr. Olson and Dr. Zimmerman. Printed by the Madison Board of Education, this is an excellent text for adults on the ecology of the oak forests of Southern Wisconsin.

2. An illustrated eight page booklet "What Is a Tour Through the Madison School Forest?" which summarizes briefly some of the learning experiences possible on the trail.

3. Two instructional sets which include filmstrips and guidebooks for classroom use: "Three Layers of Green in the Madison School Forest" for upper elementary, and "Madison School Forest: Clues to the Past Signs of the Future" for middle school. These sets were developed as part of a Local Materials project directed by Mrs. Mary Lou Peterson and funded under ESEA Title III.

Looking Toward the Future

A program maintains its vitality through continual growth and improvement. Future plans for the School Forest include beginning a summer camping program, and developing guidelines and materials for individual grade level experiences at the Forest. Coordination with programs developing at other sites in the area will be important. Recently the Madison Parks Department acquired 800 acres in a wetland known as Cherokee Marsh. Through a cooperative arrangement between the Parks Department and the Board of Education an outdoor education program has been started there. In addition efforts will be made to identify an area within walking distance of each school suitable for outdoor education. Having such areas

available would encourage more frequent and impromptu investigations of particular topics and would provide a valuable supplement to the School Forest program. The Parks Department is interested in cooperating in this effort.

What Makes It Work?

The educational opportunities for teachers and guides and the materials developed have been mentioned in detail because it is through this approach that the children traveling in the yellow school buses experience more than an isolated "nature walk" or a tree identification exercise.

The beautiful undisturbed site, while a unique asset, is not essential for a meaningful program. Any reasonably natural area with diversity in plant and animal life can be suitable. Essential factors in making best use of the site selected include an able director with conservation sense and innovative ideas, a naturalist-ecologist to train and teach guides and teachers, a supportive community and Board of Education, and a full measure of enthusiasm and commitment on the part of all those involved.

EVALUATION

Constant feedback and input are solicited from staff and students. Records of usage are kept and analyzed. A comprehensive survey of present practice was conducted in 1971 from a randomly selected sample of all levels of 1700 teachers in Madison. The survey was sponsored by the Madison Department of Curriculum Development, Department of School Community Recreation, Local Materials Development, City Parks Commission, and University of Wisconsin Conservation classes. This information has proved valuable for future planning and scheduling.

CASE STUDY

Environmental Science Center
Golden Valley, Minnesota

ORIGINATION

The Environmental Science Center was initially funded in 1967 by a three-year grant from the U.S. Office of Education under the auspices of Title III of the Elementary-Secondary Education Act of 1965 (PL 89-10). The idea to seek funds to establish the Environmental Science Center emanated from the Superintendent of Schools who recognized the need to develop and implement programs in environmental education aimed at maintaining an environmental balance.

UNDERLYING RATIONALE

The Minnesota Environmental Science Foundation has, through the Environmental Science Center, set out to provide our citizens, both young and old, with:

An ecological awareness--a concern for their total environment;

An economic awareness--a feeling for how costs relate to today's ecological problems;

A political awareness--an understanding of their individual roles as they relate to collective responsibility;

A problem analysis awareness--the ability to define resource problems, bringing to bear all facets of the situation and all points of view relating to it;

A realization that man is a part of, not apart from, Nature;

Some grounding in the dynamics of communication between men and groups.

Inherent in all aspects of the Environmental Science Center's programs is a desire to develop in its participants an "ecological conscience."

Toward this end, the Center is actively pursuing the development and implementation of:

Innovative and instructional materials;

Comprehensive in-service training programs and workshops in the environmental sciences for elementary and secondary school teachers, administrators and youth and adult organization leaders;

Identification, development, and utilization of available natural and urban areas and other community resources as environmental learning laboratories;

Programs to provide for community education stressing environmental quality and ecological balance.

PERSONNEL

During the planning stages of the program, the project was headed by the principal of the Golden Valley Middle School. He was assisted by the chairman of the science department and an elementary school teacher from the Golden Valley Public Schools. They utilized the services of a variety of resource individuals such as teachers from other metropolitan school districts; university and college professors, both in the hard sciences and education; agency people from the Department of Natural Resources, Department of Education, U.S. Forest Service, Soil and Conservation Service; personnel from the National Science Foundation sponsored curriculum projects such as the MINNEMAST program at the University of Minnesota, The Bell Museum of Natural History, the St. Paul Science Museum; and members of the Minnesota Academy of Science. No changes were made in the personnel during the development stages of the project.

Upon notification of the grant award, the chairman of the planning phase of the project immediately sought a director for the project. The director, in turn, sought out the basic personnel needed to begin the planning and development of the implementation phase of the project. The background of these individuals consisted of a former science consultant from the State of Minnesota, a former director and staff member of the MINNEMAST program at the University of Minnesota, an educator/ecologist, a recent college graduate with a major in secondary biology teaching, an elementary teacher, and a junior high school teacher. It should be noted that most of these individuals had previous experience in working with the National Science Foundation curriculum improvement programs.

The basic staff employed for the initial phases of implementation of the program still remain with the project. In addition, additional personnel with various backgrounds and expertise have been employed either on an interim or long-term basis to complement and supplement those needs that the existent staff were not able to provide. The number of staff over the years has varied from 5 to the present level of 25 staff members.

RESOURCES

Generally speaking, no special facilities were needed to implement the program of the Environmental Science Center, rather it intended to capitalize on those classroom and local settings that would lend themselves to a program aimed at acquiring an understanding of socio-ecological interrelationships.

FINANCING

It was discovered early in the implementation phase that the local school districts, utilizing the services of the Environmental Science Center, would not be able to provide long-term support for the Center. Further, it was found that support from the legislature would not be easy in coming. The reasons for this were many, but among those most paramount were the escalating costs of education, building funds, salaries, and services.

Through the Minnesota Environmental Sciences Foundation, the Center was able to extend its program offering and to continue in existence. The Foundation, with its tax-exempt, tax-deductible status [IRS 501 (C) (d)], was able to solicit from local business, industry, individuals and organizations, funding that would provide long-term support of the project. With this favorable tax status it also became eligible to seek other grant awards by federal and state agencies. In addition, the Center levied certain at-cost fees for its programs, workshops, publications and consultative services.

MATERIALS

Over 50 individual pieces of curriculum material have been developed by the Center. Most materials were developed to satisfy needs expressed by teachers taking part in the in-service program sponsored by the Center, or to satisfy

teaching needs identified by the staff. All materials have been designed to cause children to become active participants in the exploration and the study of their environment.

Curriculum materials developed by the Environmental Science Center have been distributed through various means. Most importantly, the teacher and adult participants in the programs sponsored by the Environmental Science Center have been the primary utilizers of the materials developed. Also, through advertising in the Center's newsletter, over 50,000 pieces of curriculum materials have been sold or distributed throughout the state, country, and the world. More recently, the National Wildlife Federation has undertaken the task of publishing 36 of the units of materials for sale through its national office in Washington, D.C.

EVALUATION

The objectives of the Environmental Science Center evaluation program are: (1) determine the effect of the Center in-service courses upon participants; and (2) determine the identity and number of persons served. Of particular concern is objective number (1), since in-service participants are principle disseminators of the Center's output. Accordingly, the following instruments have been used to assess the degree to which the following anticipated in-service course outcomes are realized:

1. A semantic differential test was used to measure changes in attitude toward environmental education and an inquiry strategy for teaching. The test was given under preimposed course conditions.

2. An implementation survey to determine: (a) how many in-service participants had actually used Center curriculum materials; and (b) which pieces were used most frequently. Response data indicate over 75% of all course participants have implemented an average of two curriculum pieces.

3. An opinion survey to determine participant acceptance of (a) the workshop environment, (b) its interpersonal elements. The results indicate that from a list of positively and negatively stated items respondents showed a strong tendency to agree with positive

statements. These findings indicate the workshop atmosphere and interpersonal elements were received favorably by participants.

More recently, with the receipt of additional federal funding for programs of the Center, the Center has found it necessary to employ the services of an evaluation team to evaluate specifically those programs for which funds were granted. The results of the various forms of evaluation are, and will be, implemented to improve the efficiency of program management, program development, and to provide a baseline for determining the accomplishment of long and short-term goals and objectives of the program.

TEACHER EDUCATION

A variety of instructional programs have been developed and implemented during the tenure of the project. Examples are: (1) workshops and in-service programs for teachers, youth leaders, and resource managers; (2) seminars and short courses related to environmental problem-solving; (3) natural area development and utilization studies; and (4) community environmental resources inventory programs and environmental leadership training program. These programs were conducted by the Center, either individually or in cooperation with institutions of higher learning and organizations concerned with environmental quality.

RECOMMENDATIONS FOR PROGRAM DEVELOPMENT, INITIATION AND MAINTENANCE

Any program, if it is to be successful, must capitalize fully upon the expertise, experience, and intuition of the staff, community leaders, students, program participants, and agency personnel. Their input must be solicited and considered during early developmental stages of all programs and their unique abilities utilized to implement the program when feasible. Long-term program funding requires extensive planning and management. This process must begin very early in the project and should remain flexible enough to adapt to changes in the economy of the time.

Evaluation must be planned in conjunction with the establishment of the goals and objectives of the project. They must be designed to do more than just provide statistical verification. They should provide the basis for improvement, modification, and alternatives in accomplishing the mission of the program.

CASE STUDY*

A K-12 Program In
Yarmouth, Maine

Back in 1966, prior to the popularity of "ecology" and the "public outcry against pollution," the small coastal community of Yarmouth, Maine, took its first step on the direction of what was then commonly known as conservation education. It was also during that time that federal funds were being made available to local agencies through Title III of the Elementary-Secondary Education Act for the development of educational programs. As a secondary teacher with five years of teaching experience and a strong interest in conservation education, I approached the school administration with the idea of an elementary-secondary program in this field. With enthusiastic support from the superintendent and school committee, application was made through Title III for a K-12 program. The application, however, was not successful.

Soon after this I was fortunate to receive a Leadership Development Fellowship from the Ford Foundation. The purpose of this fellowship was to provide a year of study, travel, and internship in environmental education to enable me to return to my community and establish a program. The fellowship sponsors arranged for me to attend the University of Michigan and work in the conservation education program in the Ann Arbor Public Schools with Dr. William B. Stapp as my adviser. During the year I maintained close contact with the school administration in Yarmouth regarding plans to establish a program there the following year. Upon my return to Maine, the community, with a total student population of about 1,200, hired me to become a fulltime coordinator with the responsibility to plan and implement a pilot K-12 environmental education program. It is important to note that this program was financed by local funds.

An important point to be stressed here is that the initial idea and support for the program was generated from within the school system involving both the teaching staff and the administration. Throughout the planning phase, from the program's conception to its implementation, close communications were maintained between all parties. The budgetary details, in particular, were thought out and planned at least a year in advance.

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*Reprinted by permission from: "A K-12 Program in Maine", Dean B. Bennett, in Processes for a Quality Environment, Robert S. Cook and George T. O'Hearn. editors, The University of Wisconsin-Green Bay, 1970.

Another important first step in the implementation strategy was an all-day workshop for all teachers in the school system at the beginning of the school year. The purpose of the meeting was to thoroughly acquaint all elementary and secondary teachers with the concept of environmental education. As those of you who have been associated with public education well know, the interest, confidence, and commitment of teachers are essential for the success of any educational endeavor. Therefore, I cannot stress strongly enough the importance of such a meeting for it did more to secure the initial support of teachers than any other single event. Because this approach was successfully used twice, a brief description may be usefully given here.

Not only were all teachers and administrative personnel in attendance at the workshop but also invited were town officials, key citizens from community organizations, superintendents from neighboring school systems, representatives from nearby colleges, and correspondents from the local news media. The meeting itself was carefully organized. Dr. Stapp gave the keynote address describing the concept of environmental education. A slide-tape presentation by the Natural Resources Council of Maine emphasized environmental problems in the state to accent the need for environmental improvement. The chairman of the local planning board then gave a short illustrated talk on the role of the citizen in helping the community to solve environmental problems. This was followed by Yarmouth's town manager who highlighted some of the specific problems facing the community. In the afternoon session I presented with slides the direction the pilot environmental education program might take to help youth to better understand the community's problems and help resolve them. Then all secondary teachers participated in a typical environmental education field trip, traveling through the community aboard a bus. Throughout the trip interesting aspects of the community's history, its geology and natural resources, and its environmental problems were observed and discussed. At the same time all elementary teachers were given practical techniques for using the school site as an environmental learning resource. A final summary session concluded the workshop. All teachers were asked to complete a brief questionnaire asking them how they felt their subject areas or classes could best contribute to the objectives of environmental education.

THE COMMUNITY IS THE CLASSROOM

I wish to stress that this kind of meeting is but one step of many which are necessary to keep the school and lay public informed and involved with a program of interest to both. The community is, indeed, the classroom for environmental education.

It is in this area of community and regional environmental studies that environmental education can make a most significant contribution to the total education of youth. And it is through this kind of orientation that opportunities are presented for drawing together the school and community.

Communication is a vital link in the process of implementation and an area which a coordinator must continually explore. Several avenues of communication have been pursued. Early in the program a monthly newsletter was established and it is still being sent to all teachers, administrators, and school personnel, including secretaries, custodians, bus drivers, and teacher aides. In addition, community program volunteers, town officials, and many others receive this newsletter. Also early in the program I met with the town manager, planning board chairman, and other officials to learn more about the community and to acquaint them with the program. Television, radio, and newspaper coverage were relatively easy to obtain due to the action oriented learning activities youngsters were engaged in. As coordinator, there were many opportunities to speak to local organizations. Slides of the program were very useful in this respect. Many members of these groups subsequently became involved in the program. Over a dozen volunteers were trained to lead field trips. A school site steering committee was formed, which included several community members, to develop a sixty-acre site in the center of town as an outdoor learning and recreation area. Two local organizations contributed scholarships to students and teachers for attendance at summer conservation camps. As coordinator, I worked with them helping to select candidates. Other groups have become interested in beautifying the school sites, and through the environmental education program, arrangements were made and supervision provided for student involvement in planning activities. These are real examples of the many ways environmental education programs may encourage community involvement--an aspect which should be a major point of consideration from the very conception of a program.

Following the introductory workshop meeting, the program structure and guidelines for its implementation were developed. Three broad areas of work were identified: (1) curriculum development and enrichment, (2) school site development, and (3) dissemination and public relations. Work was commenced in all three of these areas, and each will be described briefly.

The work of curriculum development and enrichment was begun immediately because this must be the central thrust of an education program. It was recognized at the outset that environmental education is not a separate discipline but an emphasis in

the curriculum-- a part of all subjects. It was also felt that successful implementation of a program depends upon it being logical, easily understood, and capable of being readily integrated into the curriculum.

As a starting point, the program accepted the definition that environmental education is an emphasis in education which aims to develop citizens who will have an understanding of their biophysical environment and associated problems, who will possess a knowledge of how they can help resolve problems, and who will be motivated to seek solutions (Stapp, et al., 1969). From this definition it was clear that the program should be organized to develop attitudes and behavior. A definition of an attitude was accepted which suggests that an attitude consists of three components: (1) cognitive or knowledge, (2) affective or feeling, and (3) action tendency or readiness to act (Katz, 1960).

On the affective side, three feelings were identified which were considered important to be developed through the program: (1) individual worth-- the idea of a self-image, (2) environmental sensitivity-- the idea of a land ethic, and (3) social responsibility-- the idea that one must work with others for the benefit of not only oneself but for the benefit of others and future generations.

On the cognitive side, six basic concepts were identified. Three dealt with the natural environment: (1) components of the environment differ in individual character, (2) they are inter-related, and (3) they are changing. Three more concepts dealt with man and his environment: (1) man is dependent upon his environment and affected by it, (2) man can alter his environment through institutional and technological systems, and (3) environmental problems result from neutral and man-made forces. These concepts were in turn broken down into sub-concepts. They formed an important conceptual framework upon which the program could be developed and integrated into the existing curriculum. It might be pointed out that the first three concepts are strongly related to the natural sciences and the latter three to the social sciences.

The concepts were related to twelve themes, six of which represent elements of the natural environment: land, water, air, plants, animals, and energy. The other six relate to the ways man interacts with his environment: land and water development, structural design, transportation, utilities, recreation, and environmental controls.

A scheme was developed whereby students could be exposed to each of these themes and related concepts at each grade level in an expanding and increasingly complex sequence. At kindergarten

and grade one the themes and concepts are related to the school environment, grades two and three--the neighborhood and home, grades four and five--the community, and grade six--the region. In grades seven through twelve, the themes become topics for presentation, student investigation, and problem solving within various subject areas. They are centered around not only local problems but state, national, and international concerns.

At the elementary level, workshops were held at each grade level for citizen volunteers and teachers. During these sessions they were introduced to the themes and concepts and trained to help lead the field trips. The workshops were followed by classroom presentations or field trip orientations, the field trips a few days later, and then follow-up activities. The field trips are, in most instances, partly by bus and partly on foot. The bus is utilized as a moving classroom with audio equipment for questioning, leading discussions, and directing attention to examples of themes and concepts along the way.

CURRICULUM ENRICHMENT

In addition to this more formal or planned curriculum contact with students and teachers each year, another important aspect involves curriculum enrichment. By this it is meant that the coordinator works to achieve the objectives of environmental education in a variety of ways as opportunities arise. For example, a resource center of teaching materials and educational aids was established. Special presentations, assemblies, and field trips are given at all grade levels. Individual and group consultations with both students and teachers are carried out. Teacher inservice workshops are conducted. I also had the opportunity to serve on both social studies and science curriculum committees.

A second major area of work is school site development. The school site offers opportunities for: (1) student environmental studies and learning experiences, (2) conservation or environmental improvement activities and projects, and (3) depending on the nature of the site, development as a school-community nature center. In Yarmouth a steering committee was formed to develop a master plan for developing a model site. The services of resource agencies, such as the Soil Conservation Service and Maine Forest Service, were tapped. A local landscape architect volunteered to serve as a consultant. At the time of this paper, a pond has been built with funds from several community organizations and the Agricultural Stabilization Conservation Service. Many trees and shrubs have been planted and a nature trail started. A sign has been constructed by the industrial arts department and two Boy Scouts as a merit badge project.

A third area of work involves communications and public relations and represents professional activities by the coordinator to expand the influence of the program. Many of these kinds of activities have already been mentioned. Several other examples may serve to illustrate the importance of this area of professional activity.

Early in Yarmouth's pilot program year, a presentation was given at a joint meeting of superintendents and school committee members from neighboring communities. These towns subsequently voted to share costs and participate in the present regional program now serving over 6,000 students in five communities. The cost is less than $4,000 per community per year, making the coordinator approach economically feasible in this situation.

The coordinator approach is perhaps an ideal way to implement environmental education programs in school systems. I have described the role that a coordinator can play in such a program. However, I believe that realistically many if not most school systems, facing rising costs and the pressure of budget cuts, will not likely adopt this approach. Instead a more feasible plan would seem to be to establish regional centers. Staffed by trained specialists, these centers could provide direction to teachers and environmental education committees within school systems. The regional coordinator could help plan units and core learning experiences around each school's curriculum. This approach, when augmented by state consultants and college and university undergraduate and graduate programs as well as inservice courses, workshops, and training programs, could begin to reach a large number of students on a relatively small per pupil cost basis.

A variety of methods for financing these regional centers should be explored. They might, for example, receive financial support from the state educational agency or the state resource agencies or both. Or they might be supported by contributions from several school systems or districts. Perhaps they could be tied to the regional planning office serving the area. Another source of support might be a college or university system. Private sources may also be able to help.

In Maine today such a regionally based program is being developed. Through Title III funding the Maine Environmental Education Project, sponsored by the Yarmouth, Maine, school system, has identified and selected four school systems which have agreed to finance environmental education programs with local funds. The four school systems are located over a wide

geographic area of Maine. From each system a teacher has been selected and is currently receiving a year's training in a master's degree program in environmental education at the University of Michigan. Upon the return of these coordinators to their school systems in the fall of 1971, they will implement regional programs.

The Yarmouth area regional program will serve as a model and resource center for these four. The program in the Yarmouth area is now under the direction of Mr. Wesley Willink. It will be my responsibility as director of the Maine project to give guidance and assistance to the four new programs. Two more school systems and trainees are scheduled to be selected for participation in the project during the next year. These programs, all based upon the coordinator concept, will provide the model programs so necessary if environmental education is to be expanded to other communities.

The possibility exists that these programs may eventually become regional centers serving a wide geographic area. In the meantime, the coordinators for these programs will be establishing programs suited to the educational needs of their respective communities and regions.

Through a workable strategy, such as the one outlined in this case study, environmental education can become a real force in education for developing citizen responsibility and environmental improvement.

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CASE STUDY*

Regional Marine Science Project
Beaufort, North Carolina

DESIGNING AN INTEGRATED PROGRAM

It sounds simple to say, "Decide what needs to be taught and then look around to see how it should be done." However, in an amazing number of cases, teachers choose a certain type of field trip because of availability, ease, proximity, or imitation and then try to warp it to fit a course need. Shortcuts in field trip planning are poor economy. Most require much leg-work, yet justify the effort.

Ideally, field-oriented instruction should be integrated so that a continuity is set up from lower grades to upper levels. Actual continuity will always be more theory than fact, of course, because of turnover in student enrollment, weak links in the teaching, and individual student differences. However, even a hypothetical sequencing of ideas from simple to complex and known to unknown is helpful to teachers. Relating field trips to existing textbooks and grade level requirements will automatically solve much of the problem.

Here is a good solid, almost classical solution for putting marine science in grades 4 through 12.

Grade 4. Studies in adaptation of individual animals to the conditions. Emphasis not on evolutionary process but on variety of adaptation within existing life forms in the sea. Field trip: salt water aquarium ideal, but any natural habitat would be suitable if specimens can be collected and/or observed.

Grade 5. Studies of community organization, showing how the variety of adaptations makes it possible for many species to have inter-related roles in a complex web. Field trip: on the New England

*Reprinted by permission from: Creating Effective Field Experiences For Coastal Schools, Will Hon and Larry W. Yeater, Regional Marine Science Project, Carteret County Schools, Beaufort, North Carolina, 1970.

or Pacific Coast, tide pools and vertical zonation on rocks would be ideal sites. In coastal Carolina we use a dredge and trawl to bring up life from the bottom of the sound and recreate a picture of the community (oyster bed).

Grade 6. Man's role at the edge of the sea, emphasizing uses of marine resources and human impact on natural communities of coastal areas. Field trip: visit to the port terminal (transportation) and a seafood processing plant (sea harvest).

Grade 7. A survey of local communities, discussing the variation of environmental factors which give rise to diverse conditions for life. Field trip: a transect through an offshore island, showing in close proximity an open ocean beach, dunes, mari-time forest, shrub thicket, salt marsh, and mud flat.

Grade 8. As part of the earth science course, a study of coastal processes, with emphasis on the natural struggle between land, sea, and atmosphere. Field trip: visit to an open beach to observe waves, longshore current, berm characteristics, and the dynamics of inlet maintenance.

Grade 9. Not included (physical science in the North Carolina system).

Grade 10. In support of the basic biology course of our high schools, the unit emphasizes ecology and uses marine habitats to demonstrate. Field trip: visit to a salt marsh to study the relation of plant and animal distribution to tidal levels and environmental gradients.

Grade 11 and 12. Advanced biology now being broadly desired in high schools, marine science seems an ideal subject in coastal counties. In the

> North Carolina project, two courses have actually evolved. One is a rather tough college prep research-oriented course in marine ecology. The other is a current event-oriented study of local problems of marine resource management, designed primarily for students preparing to work soon in the county rather than going to college. Field trip: Both courses included extensive field work, the first aimed at giving students experience in individual and team research, the latter course concerned with seeing and doing constructive management projects, and with observing local problems.

While all advanced biology students conduct individual research, there are many opportunities for extra experiences for those with initiative. Students who are willing to put forth extra effort are offered weekend research trips with professional biologists; visits to research facilities; and trips abroad oceanographic research vessels.

IMPLEMENTING THE PROGRAM

In this whole scheme, field trips may be considered the culmination of each grade level study, but classroom teaching remains the arena for most of the unit's instruction. This offers a clue as to how a school system can, with a limited number of marine biologists, put oceanology into many classrooms. A few basic facts, gleaned from experience, are necessary to explain the rationale.

In the first place, it may be assumed that an average or better teacher can take any text materials given to her and do a creditable job of having the students learn it. If she is also enthusiastic about the subject, her presentation will almost certainly be a success, and if the subject is one of inherent appeal to students, a vigorous learning situation will be created. Marine science usually has all of these things going for it in the classroom. Even a teacher who is generally weak may find that oceanology is very teachable because of its high interest nature, and the unenthusiastic teacher may find herself swept along by natural class interest. Summary: Marine science stands a good chance of being pretty successful when taught by regular classroom teachers if they are given appropriate materials.

The second fact to consider is that the best of teachers seem to fall apart in the field. One can speculate that the approaches demanded by classroom and salt marsh are too different; that both teacher and students have a rigorous in-class relationship which is difficult to alter; and that the novelty and the desire to "get out" obscure the field trip's real potentials. It's not likely that one classroom teacher in 20 can set up a field trip to satisfy an evaluator. There aren't many more teachers than 1-in-20 who are willing to mess with biology field trips. Follow-up of full-week in-service training for enthusiastic school teachers shows that only about 15% consistently use field trips in the years ahead, in spite of their sincere expectations.

The reasons why teachers don't conduct trips are many: logistics of transportation, permission slips, liability and obtaining a site; scheduling problems; administrative disapproval; added responsibilities; and reluctance to experiment. Many of the reasons are valid and very real, but the chief one is often psychological: lack of confidence. It does take a leader with much environment-specific knowledge to conduct most kinds of field trips superbly, but creditable trips could be conducted by average teachers properly inspired. The type of student discovery trip described later in this paper has many possibilities for the non-biology major serving as trip leader. However, the results of efforts to get masses of teachers to conduct effective field trips are discouraging. Summary: You cannot expect your elementary teachers to carry out extensive field trip programs, and even upper-level science teachers will need constant bolstering.

Now, combining these two facts, we have a feasible approach.

1. Let subject matter experts design curriculum units which relate closely to local environments.

2. Prepare teachers as well as is practical in the use of units; but don't be dismayed by loopholes in your in-service training.

3. Let classroom teachers present the three-week units as best they can.

4. Have field specialists conduct a field trip for each class.

This final step assures that each student will get an expertly-guided look at the real environment and will not be too misinformed even if he happened to have a poor classroom teacher. The student will have a written unit for basic information, an inspiring field trip for attitude orientation, and usually a fair three-week discussion of the environment in layman's (the teacher's) terms.

If this scheme of three-week units is adopted, the following steps (with suggested limits of practicality) would seem logical.

1. Get administrative endorsement from the top down. Reluctant principals are a constant deterrent to extensive field trip use. It is often overlooked that many principals who talk of wanting field trips really mean that a couple each year are okay, but they don't want it to be contagious. A clear-cut statement from the county superintendent about the magnitude of the field trip campaign may help really aggressive teachers to get what they need: help and encouragement.

   Closely tied to general approval are the logistical problems. Most can be handled with cooperation, but transportation is a rascal. Administrative approval should include money and approval for using school buses. There are unforeseen problems here, such as maintenance crews having difficulty fueling busses which are not on the parking lot during their scheduled service stops. Don't make every teacher fight these problems individually and don't expect her to use parent-driven cars. It is poor economy and not a long-term solution anyway.

   Achieving all of these things is tricky, and there are several approaches. The obvious one is to brainwash several school board members or the superintendent at a cocktail party and get a master plan adopted for the school system. Do that, of course, if you can, but remember that principals will still be the keys to success. How about a Friday-Saturday workshop in which principals will either observe or themselves be a field trip class, conducted by the best leaders within your reach. Carefully plan everything for their comfort and complete brainwashing.

2. Put a staff to work designing the overall plan and individual units. You can hire marine biologists, have teachers critique for grade level, and the edit extensively; or you can hire writers, have marine biologists and teachers as consultants, and edit a bit less. Both systems depend on personalities too much for

generalizations. Don't hire teachers to moonlight the work, since the job is bigger than anyone will assume, time is critical, and the odds are against a good product anyway. Although a curriculum specialist can sit down and bang out some superficially good-looking material in a few weeks, allow three months for preparation of a three-week unit. Then pilot test it on a few classes and present it to an in-service training session and revise it. An additional revision will be desirable after a year's use in the system. An experienced curriculum developer will do well to produce three units a year, and even a knowledgeable neophyte will have trouble getting out two.

3. Begin in-service training as soon as possible, using the master plan even before units are finished. Split teachers, giving background material suitable for elementary teachers in perhaps three Saturday mornings of ecology-appreciation field trips, and for the secondary science teachers conduct a more subject matter-oriented session.

   As units are completed, have grade level one-day workshops, which should probably be voluntary. Common sense prevails over zeal here, indicating that forced compliance will breed only trouble. When the time comes for units to be taught and field trips to be arranged, would you like to be the teacher who tells her class that they will not participate? There is much in your favor, and over the years you will win over many dissenters--and lose a few supporters who find that field trips aren't what they thought.

4. Introduce marine science as a new high-interest subject which replaces a chapter or two in each science book and teaches basic principles of biology, ties in with other subjects, and receives a maximum of central office help to bolster the teacher's own efforts.

5. Document all of your activities and results, maintain evaluation procedures, and use the avenues of publicity which will open up to you because of the glamourous nature of your project--boats, gulls, laughing children, wriggling sea creatures, and squealing girls.

MATERIALS

Included in this section are brief descriptions of selected materials related to environmental education. Because it is not possible to include all of the materials available, these are intended to serve as examples containing some promising trends and practices. Persons interested in developing learning experiences in environmental education need to consider carefully how these materials will fit into their curriculum and examine a wide variety of things, including nonprint as well as print materials in making their selections.

AMERICAN GEOLOGICAL INSTITUTE
ENVIRONMENTAL STUDIES PROJECT

Directors:	William D. Romey Robert E. Samples
Project Address:	Box 1559 Boulder, Colorado 80302
Publisher:	Project
Publication Date:	Set I (packets 1 and 2) 1970, revised 1971 Set II (packets 3 and 4) 1972
Availability:	From publisher
Grade Level:	1-12
Subject Area:	Multidisciplinary

Overview

The Environmental Studies Project is one part of the American Geological Institute's Earth Science Educational Program. It is funded by the National Science Foundation with additional grants from the Polaroid Corporation. "The content of the Environmental Studies materials is strongly multi disciplinary representing a many faceted involvement with the environment including its artistic, scientific, social, and mathematical aspects." The materials were developed for teachers at all grade levels as invitations for student exploration of the immediate environment. They give motivation to further examine the environment and learn to appreciate it. The materials attempt to give the students an awareness of the environment which surrounds them. The materials are being used successfully in a variety of ways in many different types of school districts.

Required or Suggested Time

The materials in Set I consist of two packets, each containing 25 assignment cards which can be utilized in a variety of ways in varying amounts of time from one day to one year.

Intended User Characteristics

These materials can be used with students on almost any grade level (they "are currently being used from first grade through college") in almost any school setting.

Rationale and General Objectives

The Environmental Studies Project represents an effort to create teacher materials which permit the student to express himself about his immediate environment. "It operates on two premises: (1) every student in an environment, and (2) the student can learn from this environment." The Environmental Studies Project represents an educational philosophy which approaches learning from the standpoint of the learner himself in his own environment.

Content

Since the immediate environment of a human being appears to be the most difficult for that human being to study, these materials endeavor to create instructional tactics and strategies that will enable students to use this resource. For example, instead of asking a student to respond to a textbook abstraction of his environment, the materials ask the student to invent the abstractions that describe what he finds around himself. "Thus, the students are more capable and sensitive to their environment." The materials are written specifically for the teacher and contain assignments, guidelines, and descriptions helpful in studying the environment. Because of the nature of the materials, they may be used as a supplement to existing courses of study or to provide a course in themselves. The materials focus upon four major areas, Change, Mapping, Counting, and Judging. "Change is a phenomenological approach that is involved with cause and effect. Mapping is a spatial approach and is primarily concerned with where things are in one's immediate environment. Counting is a statistical approach and is focused on determining how the environment can be better understood by counting certain qualities of it." Judging is the evaluative set of materials designed to get students to make value decisions about the environment.

Teaching Procedures

The assignment cards contain ambiguous suggestions for student action. They are vague because they want "kids to invent an understanding of the problem and to invent a solution." The teacher is to give the assignment on the card to the student or "let the kids choose the assignments they want to do." Some examples of these assignments are: Go outside and collect something that you could use as a tool to create some art, then create some art; find something in the environment that is increasing in number and something that is decreasing in number--and prove it!; Go outside and find two things--one of which is responsible for the other; Go outside and find a million of something and prove it; Go out and map something beneath the earth's surface. Class discussions follow.

Evaluative Data

Not available.

Materials and Cost

Environmental Studies: Set I

Packet 1 (25 assignment cards); 8 1/2" x 8 1/2"	
Packet 2 (25 assignment cards); 8 1/2" x 8 1/2"	
Teacher's Booklet, Essence, 16 pp.; 8 1/2" x 8 1/2", paperbound	$ 10.00

ECONOMICS IN SOCIETY (Formerly ECON 12)

Co-Authors:	Suzanne Wiggins Helburn, Associate Professor of Economics, Denver Center, University of Colorado John Sperling, Professor of Humanities, San Jose State College Robert Evans, Social Studies Consultant, Sonoma County Department of Education, Santa Rosa, California
Publisher:	Addison-Wesley 2725 Sand Hill Road Menlo Park, California 94025
Publication Date:	Fall, 1972
Availability:	Final Report: ERIC ED 028 093 Unit I Student and Teacher Materials: ERIC ED 040 100 and ED 040 101
Grade Level:	High School, Junior College
Subject Area:	Economics, Problems of Democracy, American Government

Overview

Economics in Society provides student and teacher materials for a one unit to one year economics course. Originally developed as a part of USOE's Project Social Studies, with additional funding by the Joint Council on Economic Education, the authors sought to implement the recommendations of the 1961 National Task Force Report, Economic Education in the Schools. Taken together, the materials comprise a teaching system with behaviorally stated objectives and a variety of teaching procedures.

The system is built around a conceptual structure which defines the study of economics and links it to the study of society. Other course organizers which students are required to learn include a set of theories (the want-satisfaction cycle, cybernetics, curricular flow systems, the multiplier) and three methods of analysis (procedures for analyzing controversies, making decisions, and building models).

Required or Suggested Time

Unit I will require from 12 to 18 weeks to complete. Units II, III, and IV can be completed in 4 to 8 weeks each.

Intended User Characteristics

The course is designed for use in a variety of school situations. No special facilities are needed. Because students work in small groups, chairs should be movable; tables or desks would be useful. If possible, the library should acquire books, periodicals, newspapers, and government documents suggested in the Teacher's Guide.

The course is written at the tenth-grade reading level and reading assignments are kept short. No previous knowledge of economics is necessary on the part of the student; nor are there any other prerequisites.

The course was designed specifically to aid inexperienced and inadequately trained teachers of economics. However, teachers with a significant background in the subject will be able to make more imaginative use of the materials. Inservice training in course implementation is useful but not mandatory.

Rationale and General Objectives

The authors believe that economic literacy is essential if an individual is to function usefully in society. Carefully prepared materials can introduce students to the power of economic analysis.

The primary emphasis is on learning the skills of economic reasoning and applying them to current public policy issues. By the end of the course, students should be doing the following without prompting from the teacher:

1. using the course conceptual structure to explain or explore topics related to economics;

2. building models describing different aspects of economic organization (the models might be presented in words, graphs, tables, diagrams, equations, pictures, etc.);

3. using models, either their own creations or models introduced in the course:

   a) to study and compare economic systems, ideologies, and political issues;

   b) to evaluate economic policies;

4. using the conflict analysis procedures introduced in the course and the conceptual structure to identify major issues of fact, definition, and values in discussing or writing about economic controversies;

5. making decisions about economic issues which they can justify as being consistent with verifiable generalizations about the economy and with their own values, and which show the use of alternative cost calculations.

Content

Below are listed Unit and Part titles:

Unit I: Economics in Society

Part 1: Economics: Its Subject and Importance
Part 2: Organizing Production for Economic Growth
Part 3: Money, Credit, and Exchange
Part 4: Financing Economic Growth
Part 5: Markets: The World of Pure Competition
Part 6: U.S. Markets: The Real World of Imperfect Competition with the U.S.
Part 7: Work, Income, and Welfare in the U.S.
Part 8: The Economy as a System
Part 9: Predicting Changes in GNP
Part 10: Monetary and Fiscal Policy
Part 11: Price Determination in a Competitive Market
Part 12: Market Resource Allocation: The Cases of Pure Competition and Pure Monopoly
Part 13: Structure, Conduct, and Performance of Real Markets

Unit II: National Goals and Priorities

Unit III: Communist Economies

Unit IV: Third World Economies

In the course there are a number of activities and readings devoted to environmental issues. For example, there are activities on defining Gross National Product and Net National Amenities, Unit I, Part 9; Growth and Change in the U.S. Economy, Unit I, Part 2; and Limiting U.S. Population Growth, Unit I, Part 2. In addition, there are readings from Thomas Malthus, the Conservation and Natural Resources Subcommittee of the Committee on Government Operations (U.S. House of Representatives), and other important documents on natural environment, resource use, pollution, national priorities, and environmentalist value positions.

Teaching Procedures

The instructional theory is based on Richard Suchman's thinking-learning model which draws from both field and stimulus-response theory. The use of organizers to select, group, and order experiences is stressed. A variety of suggested teaching strategies and materials is used, depending on the learning objectives to be achieved. Programmed instruction,

in short units aimed at specific learning tasks, can be pursued at the student's own pace. Other materials provide topics, questions, and problems for class discussion and small group work. Materials are provided for role-playing, survey research, and debates. Some mini-lectures for presentation of new information and for summing-up or setting-up are suggested. There are self-evaluation tests for student use.

Evaluative Data

All project evaluation was formative evaluation--feedback to the development team to help them in making the many curriculum and materials decisions. The project staff did not undertake any summative evaluation.

Materials and Cost

Materials for the course will include student materials, a teacher's guide, and an inservice training kit. Cost of these materials has not been determined.

CALIFORNIA, UNIVERSITY OF, AT BERKELEY
ASIAN STUDIES CURRICULUM PROJECT
ASIAN STUDIES INQUIRY PROGRAM
Man and His Environment in Asia
Food and Survival in Asia

Director:	John U. Michaelis, Professor of Education University of California at Berkeley Robin McKeown, Coordinator
Project Address:	School of Education Tolman Hall University of California Berkeley, California 94720
Publisher:	Field Educational Publications, Inc. 609 Mission San Francisco, California 94105
Publication Date:	1969
Availability:	From publisher
Grade Level:	10
Subject Area:	Asian Studies

Overview

The Asian Studies Inquiry Program was developed under the auspices of USOE's Project Social Studies. The overall program includes three "clusters" of materials dealing with the themes "Asian Thought," "Changing Patterns of Asian Life," and "Traditional Patterns of Asian Life." The latter cluster includes two units which deal with man-environment relationships: Man and His Environment in Asia and Food and Survival in Asia. The total program is designed to help students in developing their own conclusions about Asia, past and present, and is based on well-defined social science concepts, an extensive rationale, and well-stated general objectives. The two environmentally relevant units provide a striking contrast to the traditional American view of man-land relationships.

Required or Suggested Time

Each of the two units is expected to comprise about one week's class work. Individual lessons within each unit booklet can be used separately.

Intended User Characteristics

Since the program is primarily aimed at understanding Asian cultures rather than environmental problems in technologically advanced

countries, the teacher must himself develop specific strategies for tying these readings and discussions to current environmental issues in the U.S., such as water pollution, land use, and resource allocation. This will require a degree of already existing environmental sophistication on the part of the teacher.

Rationale and General Objectives

Rather than memorizing such minutiae as the dynasties of China, a student should confront universal concepts such as the nature of man, progress, man's relation to man, man's relation to nature, and the purpose of government. In the Teacher's Guide it states that one of the most convincing reasons for studying Asia is that it offers a rich variety of views of man.

General objectives for the program are to provide knowledge of Asian cultural patterns, classroom experience with universal issues and problems illuminating human behavior from a variety of cultural perspectives, use of inquiry skills, and the development of positive attitudes toward Asia and its study.

Content

Man and His Environment in Asia and Food and Survival in Asia are part of the third "cluster," "Traditional Patterns of Asian Life," which focuses on the relationships between the geography, climate, philosophies, and religions of Asia and Asian economic, political, and social institutions.

Man and His Environment in Asia is divided into two sections, "Asia's Physical Diversity," and "Asian Man and His Environment." The first contains readings on the effects of monsoons on Indian life, the diversity of culture and geography in Southeast Asia, the Japanese use of the sea, the effects of drought on a Chinese village, and the problems of fully utilizing the Mekong River. The second section includes two readings on irrigation problems in China and Taiwan, one on land reclamation in China, one on a cholera epidemic in the Philippines, and one on village life in India. The concluding questions in the Teacher's Manual are intended to draw out discussion about the strong, but never totally deterministic, influence of geography on cultural patterns in Asia.

Food and Survival in Asia focuses on the relationships among population, culture, and food production in Asia. It is composed of two sections, "The Impact of Hunger and Poverty in Asia," and "The Causes of Hunger and Poverty in Asia." The first section includes several readings on the effects of famines, a description of the style and standard of living in village India, a reading on Chinese communal agriculture, and several readings on urban poverty in Asia. The second section includes a reading on the impact of climate on Asian life, several readings on the effects of traditional Asian outlooks on progressive economic and technological programs, a reading discussing the

various factors discouraging energetic pursuit of agricultural improvement, a reading on waste, and a reading on the implications of population growth for Asia. The concluding questions in the Teacher's Manual encourage discussion of the effects of poverty and hunger on Asian life, a search for the causes of such conditions, and projections of ways to solve the hunger and poverty problems of Asia.

The readings in both units are of very high quality and are written in a variety of styles, from scholarly to literary.

Teaching Procedures

The general classroom strategy consists of discussions based on the readings. The Teacher's Manual suggests several discussion questions for use with each reading and furnishes a description of an inquiry model which the developers feel is appropriate to reaching the desired student understandings. Students are expected to raise questions of their own and to create ideas and try them out on their classmates. The teacher is to restrict himself to open-ended questions and refrain from giving absolute answers.

Evaluative Data

Not available.

Materials and Data

Student Text:

Man and His Environment in Asia. By Christopher L. Salter; 7 1/4" x 9 3/4" papercovered booklet; 64 pp., packs of 10 — $ 9.00

Food and Survival in Asia. By Robin J. McKeown; 7 1/4" x 9 3/4" papercovered booklet; 64 pp., packs of 10 — $ 9.00

Teacher's Guide:

Traditional Patterns of Asian Life. 7 1/4" x 9 3/4" papercovered booklet; 48 pp. — $ .75

For information on other materials available in the Asian Studies Inquiry Program, write the publisher.

JOINT COUNCIL ON ECONOMIC EDUCATION
THE ECONOMICS OF POLLUTION

Authors:	Harold Wolozin, University of Massachusetts at Boston Patricia R. Reilly, John Dewey High School, New York City
Publisher:	Joint Council on Economic Education 1212 Avenue of the Americas New York, New York 10036
Publication Date:	1970
Availability:	From publisher
Grade Level:	9-12
Subject Area:	Economics

Overview

The Economics of Pollution is one of the pamphlets in the Economic Topic Series published by the Joint Council on Economic Education. It is a trilogy by Professor Harold Wolozin of the Economics Department at the University of Massachusetts at Boston. Part One examines the economic relationships that help to explain why pollution is a special problem of production and consumption. Part Two surveys the difficulties of measuring and assigning costs. In Part Three measures used to combat pollution are analyzed. Accompanying each article are teaching suggestions for utilizing the information in Dr. Wolozin's materials. These suggestions are written by Patricia R. Reilly, who is a teacher of high school economics. She has set down instructional objectives, ideas for motivating students, strategies for analysis of pertinent questions, and graphic materials for clarifying issues.

Required or Suggested Time

No specific time is suggested by the authors; however, the suggested strategies and activities could be utilized in a period ranging from one week to several weeks. The material is designed as a plug-in unit in an existing economics or social studies course.

Intended User Characteristics

The materials could be used with students in grades 9 through 12. Any social studies teacher can successfully implement the materials, although some background in economics would be helpful.

Rationale and General Objectives

Since pollution of the environment is one of the hottest issues of our time, the Joint Council on Economic Education felt it necessary to produce materials which would deal with the economics of pollution. One major question is whether economic growth is possible without proportionate increases in the pollution of our air, land, and water. Since "the quality of our environment is imperiled, our cities may become uninhabitable and our countryside may be irretrievably blighted." Students should be motivated to investigate the problems of pollution.

Content

The authors present in Part One: The Anatomy of Pollution, an introduction to the problems of pollution. "Our technology and vast output of goods and services ... produces, in increasing quantities, the waste and pollution which threatens us. Our dilemma is whether economic growth ... can be maintained ... without irreversibly polluting the resources upon which economic development and growth depend." They present an overview of the pollution threat by giving information about air pollution, water pollution, and solid waste pollution. In Part Two the question of measuring the costs of pollution is raised with external versus internal costs, external costs and resource allocation, and the relationship between costs and pollution criteria is discussed. Part Three deals with the question--can pollution be controlled? It examines the political and economic problems which make it difficult to control pollution. The social costs of pollution--the damage to the total community--are explained and new ways suggested for dealing with the problem in the future.

Teaching Procedures

Suggestions for motivating students are offered--"What can be more relevant than their personal survival?" Using quotations from the articles to begin discussion, charting the amount of waste from American homes, film-making of problems of the immediate environment, and sound-and-sight presentations all can be used to motivate students. As the authors suggest, "Any departure from the traditional question and answer method depends on the ability of the students, the availability of equipment and materials, and time allotment for teacher preparation." Discussion questions, teaching models, analysis strategies, special project suggestions, sources of print and visual materials, and suggested readings are all offered as aids for the teacher.

Evaluative Data

Not available.

Materials and Cost

The Economics of Pollution. By Harold Wolozin and Patricia R. Reilly. 18 pp., 8 1/2" x 11", stapled paper cover $ 1.00

UNIVERSITY OF MINNESOTA PROJECT SOCIAL STUDIES
FAMILY OF MAN

Director:	Edith West
Project Address:	Minnesota Project Social Studies University of Minnesota Minneapolis, Minnesota 55455
Publisher:	Selective Educational Equipment, Inc. (SEE, Inc.) 3 Bridge Street Newton, Massachusetts 02195
Publication Date:	Levels I and II: Family Studies Hopi Indian Family, 1971 Japanese Family, 1972 Family of Early New England, 1972 Ashanti Family of Ghana, 1972 Kibbutz Family in Israel, projected March 1972 Soviet Family in Moscow, projected June 1972 Quechua Family in Peru, projected 1973 Algonquin Indian Family, projected 1973 Levels III and IV: Community Studies Contrasting Political and Social Institutions: Contrasting Communities: Urban and Rural, projected August 1972 The Gold Mining Camp in California, projected November 1972 The People of Paris, projected 1973 The Manus Community of the Admiralty Islands, projected 1973 Contrasting Economic Systems: Our Own Community: Economic Aspects, projected 1973 Village in India, projected 1973 Economic Life in the Soviet Union, projected 1973 The Trobriand Islanders, projected 1973
Availability:	From publisher
Grade Level:	K-5
Subject Area:	Interdisciplinary Anthropology, Sociology, History, Economics, Geography, Political Science

Overview

Family of Man is a multi-media, elementary sixteen unit series which is part of a K-12 curriculum developed by the University of Minnesota Project Social Studies. Each unit, which is packaged in a kit, constitutes a learning system which includes an elaborate media package of filmstrips, audiotapes, printed originals for making student handouts, artifacts, and a teacher's resource guide. Through study of families and communities, students learn to understand concepts and generalizations from the social studies.

Required or Suggested Time

A set of three or four of the kits may be used interchangeably to make up a one-year social studies program. Single units can also be utilized to enrich and supplement existing courses.

Intended User Characteristics

In order to enhance the adaptability of the materials, the units are not labeled by grade so that they can be used at higher or lower levels or in non-graded or open classrooms. Any competent social studies teacher can teach the program, although he is encouraged to utilize the teacher's guide and read the "Rationale and Overview." Information about inservice training and consultants is available from SEE, Inc.

Rationale and General Objectives

One of the major features of this curriculum is the provision for continuity and early development of content, generalizations, skills, and attitudes with culture as the cornerstone and unifying theme. Values which are sought are curiosity about social data, respect for human dignity, [illegible] understanding of how varying value systems modify and shape the use of the environment.

Content

The content of Family of Man is drawn from all the social science disciplines. The students deal with concepts relating to culture, social organization, social process, and site (which is defined as cultural adaptation to the environment) by comparing families and communities in many societies. For instance, the Hopi Indian Family, the Japanese Family, and the Family of Early New England deal explicitly with societal values which foster positive interaction between man and his environment. The Kibbutz Family in Israel is illustrative of productive ways in which man can modify an overtly hostile environment, while the Soviet Family in Moscow deals with the impact of technology.

Teaching Procedures

Inquiry is emphasized as a teaching strategy, but it is also recognized that other methods may be more appropriate in reaching certain

goals or developing specific skills. The Resource Guides contain "Suggestions for Teaching" each activity, and an array of informational material. Each of the suggested activities is related to the content.

Evaluative Data

The Family of Man multi-media units have not been objectively evaluated; however, the prototype units from Minnesota were studied in a number of schools. Standardized test results showed that the students using the material did as well or better, with respect to content, than control groups in regular courses.

Materials and Cost

Hopi Indian Family Kit:
- 9 children's books
- 30 study prints (11" x 14")
- 2 color filmstrips: Traditional and Contemporary Hopi Life
- Audio tape cassettes: Hopi legends and music
- 3 magnetic compasses
- 4 artifacts: yucca sifting basket, Katchina doll, pottery bowl, Hopi toy
- Ear of corn
- 3 printed originals for duplication: family structure sheet, Hopi song lyrics, and chart
- Teacher's Resource Guide: 91 pp., 8 1/2" x 11", paperbound
- "The Rationale and Overview." 38 pp., 6" x 9", paperbound
- Materials come in a 20 1/2" x 14" x 6" carrying/storage case
- Complete Kit $ 174.00

Japanese Family Kit:
- 11 children's books
- 11 study prints (11" x 14")
- 3 color filmstrips: Village and City Life in Japan
- 1 audio tape cassette: Japanese children's stories and music
- 3 magnetic compasses
- 1 Japanese flag
- Wall map of Japan
- Rice seed
- Origami paper
- 17 artifacts: teapot, teacup, rice bowl, rice paddle, small dish, 36 pairs of chopsticks, child's kimono sash, geta, slippers, Buddha statue, incense burner, abacus, calligraphy set
- 7 printed originals for duplication

"A Rationale and Overview." 38 pp., 6" x 9", paperbound
Teacher's Resource Guide. 124 pp., 8 1/2" x 11", paperbound
Materials come in two 10 1/2" x 17 1/2" x 5", and 15" x 10" x 4 1/2" carrying/storage case
Complete Kit $ 174.00

Family of Early New England Kit:
4 children's books
General reference book
20 study prints (11" x 14")
2 color filmstrips: Early New England Life
1 audio tape cassette: Early New England Songs and Stories
3 magnetic compasses
Ear of Indian corn
10 artifacts: churn, broom, slate and pencil, quill pen and ink well, tin candle-stick, bayberry candle, corn husk doll, toy top
7 printed originals for duplication
"A Rationale and Overview." 38 pp., 6" x 9", paperbound
Teacher's Resource Guide: 120 pp., 8 1/2" x 11", paperbound
Materials come in a 36" x 18" x 4" corrugated cardboard carrying/storage case
Complete Kit $ 174.00

Ashanti Family of Ghana Kit:
17 children's books
20 study prints (11" x 14")
2 color filmstrips: Ashanti Life in Ghana
1 audio tape cassette: Ashanti Songs and Legends
3 magnetic compasses
Cocoa beans
6 artifacts: Ashanti stool, Kente ceremonial cloth, go d weight, an Akuaba doll, Ovare beard and beads
5 printed originals for duplication
"A Rationale and Overview." 38 pp., 6" x 9", paperbound
Teacher's Resource Guide: 115 pp., 8 1/2" x 11", paperbound
Materials come in a 36" x 18" x 14" corrugated cardboard carrying/storage case
Complete Kit $ 174.00

Available Separately:
A Rationale and Overview. 38 pp., 6" x 9", paperbound $ 3.00
Additional Teacher Resource Guides with set of originals $ 8.00
Price lists for individual replacement items are available on request.

JOINT COUNCIL ON ECONOMIC EDUCATION
"NATURAL RESOURCE USE IN OUR ECONOMY"

Authors:	William H. Stead and George L. Fersh
Project Address:	Joint Council on Economic Education 1212 Avenue of the Americas New York, New York 10036
Publisher:	Joint Council on Economic Education 1212 Avenue of the Americas New York, New York 10036
Publication Date:	1960
Availability:	From publisher
Grade Level:	Teacher material for use in grades 3-12
Subject Area:	Economics

Overview

The Joint Council on Economic Education has supported many ventures in the economic education field. This teacher's reference and guide grew out of several year's experience during the 1950's bringing economic principles to the attention of conservation educators.

Required or Suggested Time

No time dimensions are given. Suggested activities at the elementary level could take 2-4 weeks. Suggestions at junior and senior high school level could take 4-8 weeks.

Intended User Characteristics

Suggestions are intended for the full range of students. No special suggestions are given for particular groups.

Rationale and General Objectives

The objective is to give the teacher enough information and understanding of the economics of resource use and management so that he/she can incorporate this knowledge into the material taught. An economically literate public is felt to be crucial to sound economic policy formation.

Content

The pamphlet provides brief statements concerning the cost of resource use, shortages, the nature of energy, renewable and exhaustible

resources, technology, economic problems, and public policy questions. Broad aspects of environmental impact are not included.

Teaching Procedures

Discussion questions under the heading "Thinking and Talking It Over" appear after each subject presentation. A concluding section, "Generalizations and Classroom Learning Activities," contains four pages of suggestions for elementary and 23 pages for secondary grades.

Evaluative Data

Not available.

Materials and Cost

Teacher's Materials:	
Reference guide, 88 pp.:	$ 1.25

EDUCATIONAL RESEARCH COUNCIL OF AMERICA
CONCEPTS AND INQUIRY

Director:	Raymond English
Project Address:	Educational Research Council of America Rockefeller Building Cleveland, Ohio 44113
Publisher:	Allyn & Bacon, Inc. 470 Atlantic Avenue Boston, Massachusetts 02210
Publication Date:	Kindergarten-Grade 3, 1970 Grades 4-6, 1971 Grades 7-8, 1972 Grade 9, 1973
Availability:	From publisher
Grade Level:	K-9; materials for Grades 10-12 presently being tested and revised
Subject Area:	Multidisciplinary Anthropology, Economics, Geography, History, Political Science, Psychology, and Sociology

Overview

The materials in this social science program developed by the Educational Research Council of America are structured around the basic concepts, skills, and learning processes of all the social science disciplines. The program is sequential and cumulative with specific concepts introduced at lower levels developed with increasing sophistication as the student progresses. The teacher's guides clearly indicate the general philosophy of the program, discuss the overall objectives, and demonstrate how the individual units fit into the whole. Some of the units are more directly related to areas of environmental concern, but in almost every year's program some attention is paid to concepts which have importance in environmental education.

Required or Suggested Time

Each program is designed as a one-year course for a particular grade; however, the student materials are not labeled so that they can be used flexibly in an ungraded situation.

Intended User Characteristics

The developers state that although the program offers a variety of optional materials and activities to reach most student populations, it may not be satisfactory in reaching the needs of students with poor

reading skills or from disadvantaged backgrounds. The teacher's guide is clear enough and explicit enough so that any teacher could implement the course without further training.

Rationale and General Objectives

The educational philosophy of the curriculum emphasizes the transmission of culture and the analysis of values in human societies through the acquisition of a usable, coherent body of social science skills, knowledge, and attitudes. It is felt that by exposing students to a discrete body of knowledge and skills, they will be able as adults to make informed decisions in matters affecting them and the world.

Content

Environmentally sound concepts such as "Man and His Environment"; "The Nature and Importance of Values"; "Norms and Relativity"; "The Nature of Man"; "Specialization"; "Agriculture, Manufacture, and Services"; "Cultural Differentiation"; and "The Nature of Law" are considered at all grade levels. "Earth sciences in relation to social science" and "spatial interconnections" are taught in grades one through six; and "economic growth," "social harmony and disharmony," and "demography" are treated in grades two through six.

Teaching Procedures

The focus of the materials is on inquiry strategy although they provide for a variety of techniques. The students are encouraged to become actively involved in the learning process and to apply the skills of problem solving.

Evaluative Data

Not available.

Materials and Cost

Kindergarten:

First Semester: Learning About the World	
Student Text: none	
Teacher's Guide: 267 pp., 8" x 10", paperbound	$ 4.68
Teacher's Kit: pictorial materials for bulletin board and transparency masters in 8" x 10" manila envelope	$ 1.68
Second Semester: Children in Other Lands	
Student Text: Children in Other Lands. 44 pp., 8" x 10", paperbound	$ 1.32
Teacher's Guide: 275 pp., 8" x 10", paperbound; full color photographs and paintings	$ 4.68
Teacher's Kit: pictorial materials for bulletin board and duplicator transparency masters in 8" x 10" manila envelope	$ 1.32

Grade One:

First Semester: Our Country	
Student Text: Our Country. 75 pp., 8" x 10" paperbound	$ 2.00
Teacher's Guide: 435 pp., 8" x 10", paperbound	$ 6.00
Second Semester: Explorers and Discoverers	
Student Text:	
14 texts, each dealing with different explorers, 8" x 8", paperbound; each	$ 1.32
Teacher's Guide: Explorers and Discoverers. 322 pp., 8" x 8", paperbound	$ 6.00
Sound filmstrips:	
3 sets, each dealing with several explorers	$36.00 to $45.00

Grade Two:

First Semester: Communities at Home and Abroad	
Student Text:	
3 titles, 134-170 pp. each, 8" x 10", paperbound; each	$ 2.00
Teacher's Guide: Communities at Home and Abroad. 367 pp., 8" x 10", paperbound	$ 6.00
Second Semester: American Communities	
Student Text:	
An Historical Community: Williamsburg, Virginia. 122 pp., 8" x 10", paperbound	$ 2.00
A Military Community: Fort Bragg, North Carolina. 66 pp., 8" x 10", paperbound	$ 1.32
An Apple-Growing Community: Yakima, Washington. 58 pp., 8" x 10", paperbound	$ 1.32
A Forest-Products Community: Crossett, Arkansas. 71 pp., 8" x 10", paperbound	$ 1.60
A Steel-Making Community: Pittsburgh, Pennsylvania. 119 pp., 8" x 10", paperbound	$ 1.80
A Rural Community: Webster City, Iowa. 162 pp., 8" x 10", paperbound	$ 2.00
Teacher's Guide: American Communities. 367 pp., 8" x 10", paperbound	$ 6.00

Grade Three:

Student Text:	
First Semester: The Making of Anglo-America. 282 pp., 8" x 10", paperbound	$ 2.56
Second Semester: The Metropolitan Community. 184 pp., 8" x 10", paperbound	$ 1.92
Teacher's Guide: The Making of Anglo-America and The Metropolitan Community. 419 pp., 8" x 10", paperbound; for both semesters	$ 6.00

Grade Four:

First Semester:

Student Text: Agriculture: Man and The Land. 250 pp., 8" x 10", paperbound $ 2.25

Teacher's Guide: Agriculture: Man and The Land. 204 pp., 8" x 10", paperbound $ 2.25

Second Semester:

Student Text: Industry: Man and The Machine. 249 pp., 8" x 10", paperbound $ 2.55

The Indian Subcontinent. 124 pp., 8" x 10", paperbound $ 1.65

Teacher's Guide: Industry: Man and The Machine. 178 pp., 8" x 10", paperbound $ 1.35

The Indian Subcontinent. 108 pp., 8" x 10", paperbound $ 1.50

Grade Five:

The Human Adventure

Student Texts:

4 student texts, 154-170 pp., 8" x 10", paperbound; each $ 1.92

Teacher's Guide for each of above; 121-131 pp., 8" x 10", paperbound; each $ 1.35

Student Text: Lands of the Middle East. 157 pp., 8" x 10", paperbound $ 2.25

Teacher's Guide: Lands of the Middle East. 112 pp., 8" x 10", paperbound $ 1.50

Grade Six:

The Human Adventure

Student Texts:

4 student texts, 169-171 pp., 8" x 10", paperbound; each $ 1.98

Teacher's Guide for each of the above; 98-149 pp., 8" x 10", paperbound; each $ 1.35

Student Text: Lands of Latin America. 186 pp., 8" x 10", paperbound $ 2.25

Teacher's Guide: Lands of Latin America. 124 pp., 8" x 10", paperbound $ 1.50

GROUP FOR ENVIRONMENTAL EDUCATION, INC.
OUR MAN-MADE ENVIRONMENT, Book Seven

Directors:	Alan Levy William B. Chapman Richard Saul Wurman
Project Address:	Group for Environmental Education 1214 Arch Street Philadelphia, Pennsylvania 19107
Publisher:	Same as project
Publication Date:	1970
Availability:	From project
Grade Level:	4-11
Subject Area:	Environmental Education; Interdisciplinary

Overview

Book Seven of Our Man-Made Environment was developed in cooperation with the Division of Art Education, School District of Philadelphia, and the Philadelphia Chapter of the American Institute of Architects. The unit is an attempt to help children begin to become aware of the man-made environment--that is, to understand what constitutes a man-made environment, for what purposes this environment has been created, and how we could, in the future, improve upon it. In short, the emphasis is on sensitizing the observer to the influences of the man-made environment on his life and, if he is dissatisfied with it, helping him to understand his responsibility in changing the situation.

Required or Suggested Time

This program is designed for use as a unit within an environmental education course. It may be used in language arts, fine arts, social studies, or mathematics courses. There are seventeen complete exercises, each taking about 25 minutes of classroom time to accomplish.

Intended User Characteristics

The materials are most suited to the urban, poverty-area youth of mixed ethnic background. However, the materials have been successfully used with upper-middle-class suburban children as well. It has been very successfully used with slow learners, particularly in the higher elementary grades. It has also been successfully used in junior high, high school, and college classes.

Rationale and General Objectives

The authors of this kit were concerned that students have not developed feelings of efficacy in influencing the man-made environment, and because of this, the students have felt little or no responsibility for it. In order to change the man-made environment, man must understand his role as both a creator of it and a controller of it. The general objective of the kit is to sensitize the student to the man-made environment and help him reach rational judgments about how it should be changed to be more closely attuned to his value systems. The four basic questions noted below under Content are intended to guide the student in becoming a concerned observer of the man-made environment. It is hoped that his ability to generate some well thought out responses to the good and bad points of the built environment will be increased.

Content

Book Seven encourages students to cope with four overall questions: (1) What is the man-made environment? (2) Why do we build our environment? (3) What determines the form of our environment? and (4) How do we change our man-made environment? It is divided into four sections, each emphasizing one of these questions. Each section is composed of a series of problem-solving exercises for the student. The techniques necessary to solve some of the problems posed encourage the student to think in terms of architectural structure; cost of building materials; the relationship of the building to the surrounding community--both man-made and natural; the problems of engineering; and the social attitudes which affect the problem.

Teaching Procedures

Problem-solvirg exercises are offered throughout the four sections of the kit; "punchout" models of shapes, designs, and configurations are provided; several simulations are suggested; and short readings deal with each of the four basic questions. The kit suggests that teachers not limit themselves to the activities provided, but expand both the content and teaching strategies. The relationship between the "punchouts" provided and the narrative description is carefully developed and will motivate students to investigate the relationship between design and the man-made environment.

Evaluative Data

The materials were tested in the Philadelphia public schools in Grades 6, 7, and 8. They were revised according to the data gathered and Book Seven now represents a second revision.

Materials and Cost

The kit contains three components--a set of readings to be used by both teacher and student, 10 "punchout" cards and seven sheets of tracing paper.

Student and Teacher Materials:

Our Man-Made Environment: Book Seven. 80 pp., 9 1/2" x 11 3/4", stapled paper cover.	
25 booklets or more	$ 1.30 each
25 sets of replacement "punchouts" and tracing paper	$12.30 per set

HARVARD UNIVERSITY
SOCIAL STUDIES PROJECT
Municipal Politics
Science and Public Policy

Directors: Fred M. Newmann, Professor of Curriculum and Instruction, University of Wisconsin

Donald W. Oliver, Professor of Education, Harvard University

Project Address: Appian Way
Cambridge, Massachusetts 02138

Publishers: American Education Publications
Education Center
Columbus, Ohio 43210

Publication Date: 1967; 1969

Availability: From publisher

Grade Level: 9-12

Subject Area: Political Science, History of Science, Ethics

Overview

The Harvard Social Studies Project has developed curriculum materials, teaching approaches, and evaluation devices based on the conviction that the analysis of public controversy should command primary attention in the teaching of social studies in public secondary schools. The project has gone through five phases in producing these materials: 1) development of materials; 2) experimental trial of materials; 3) evaluations; 4) revision of materials for publication; and 5) systematic examination of concepts upon which the project is based.

Required or Suggested Time

The unit books each require one to three weeks, depending on the amount of discussion and emphasis placed upon them by the teacher and class.

Intended User Characteristics

The materials are intended for use as supplementary materials and can be included in any social studies course to which they apply. They are intended for all students of average ability in grades 9 through 12. Effective use of the "inquiry method" of discussion requires some thought and practice by the teacher, as well as a willingness to deal frequently with controversial issues in an open and energetic manner.

Rationale and General Objectives

The most broadly stated objective is to train students to examine and analyze, through discussion and argument, the kinds of disputes which give birth to social conflict. The project developers state that by considering a variety or situations throughout history and across cultures, by viewing the situations in terms of various social science concepts and theories, and "by examining and weighing various methods for reaching and justifying positions, students will hopefully gain certain powers of analysis that will aid them in discussing value dilemmas on which public controversy thrives.

Content

Two of the unit books produced by the project, Municipal Politics and Science and Public Policy, deal with environmental issues.

Municipal Politics is designed to show that conflict is a fact of life in every American city. Whenever there is a public problem, interested groups and individuals propose different and often antithetical "solutions." The student material is a fictionalized case study in which community decision-makers grapple with the important concept of land use. Students are expected to understand and deal with such concepts as expertise, authority, political strategy, self interest, community interest, majority of citizens, interest groups, and power elite.

Science and Public Policy contains a series of short readings, each followed by questions, which serve as the basis of class discussion. The readings describe a variety of situations, both real and fictional, in which the relationships between scientists and public decision-makers are called into question. The case studies include:

1) Galileo, the Church, and Copernican theory;

2) fluoridation of municipal water supplies;

3) Oppenheimer, nuclear research, and national security;

4) chemical-biological warfare research; and

5) genetic research.

Teaching Procedures

Emphasis is placed on continuing dialogue with students, simulation and moderation of discussion and argument. Taking a Stand, the unit book which the project suggests classes use before any others in the Public Issues Series, introduces students to the elements of discussion of controversial issues. Cases and Controversy: Guide to Teaching the Public Issues Series provides guidelines to the teacher for conducting discussions of controversial issues, using the "Socratic method." In addition, both Municipal Politics and Science and Public

Policy are accompanied by short Teacher's Guides offering specific suggestions for discussion of the two unit books.

Evaluative Data

The Project has conducted two major types of evaluation: informal clinical evaluation of the ongoing teaching, and systematic evaluation of the program at its termination. The results of the first are reflected in the revised teaching and testing materials in the Public Issues Series. Results of the second are in the Final Project Report. The summary of results is rather inconclusive and the question of whether it is possible to teach average high school students to carry on intelligent discussions about social issues remains essentially an open one, subject to further examination and testing.

Materials and Cost

Student Materials:
24 unit books by Fred M. Newmann and Donald W. Oliver; each is 5" x 8", stapled, paper covered; priced at $ .35 per copy in quantities of 10 or more of one title; available from publisher. The two unit books which deal with environmental issues are:

Municipal Politics, 47 pp.
Science and Public Policy, 47 pp.

A list of other unit books may be obtained from the publisher.

Teacher's Guide:
4 pp., 8 1/2" x 11", printed leaflet with specific suggestions for teaching strategies for the issue and 2 possible objective tests; free with order of 10 or more.

Additional Guide:
Cases and Controversy. 15 pp., 8 1/2" x 11", stapled paper cover; describes suggested discussion techniques; 1 copy sent with each order of 10 or more copies of one title of the student materials.

HIGH SCHOOL GEOGRAPHY PROJECT
GEOGRAPHY IN AN URBAN AGE
UNIT 5: "Habitat and Resources"

Director:	Project closed in August 1970 Former directors are William Pattison, Nicholas Helburn, and Dana Kurfman
Project Address:	Project business is being handled by the Association of American Geographers 1146 16th Street, N.W. Washington, D.C. 20036
Publisher:	The Macmillan Company School Division 866 Third Avenue New York, New York 10022
Publication Date:	Units 1 and 2, 1969 Units 3 through 6, 1970
Availability:	From publisher
Grade Level:	10 (7-12)
Subject Area:	Geography core Anthropology, Economics, History, Political Science, and Sociology

Overview

High School Geography Project materials were developed by the Association of American Geographers during a ten-year period which ended in 1970. Funds were obtained from a variety of sources including over $2 million from the National Science Foundation. Unit 5, "Habitat and Resources," should be included among the best material available in environmental education from the social sciences. It contains good social science tools and content designed to foster student involvement with real world problems. Other units from High School Geography Project could be utilized for concept development, but they do not focus as directly on environmental problems. The multidisciplinary program was designed primarily as a one-year geography course for tenth graders; however, it has been used successfully at all secondary levels. "Habitat and Resources" is a 5-7 week unit which contains a vast array of student activities and educational media. Evaluation of High School Geography Project indicates significant cognitive and affective growth is attained with its use.

Required or Suggested Time

The course is designed for a one-year course in geography. Units can be purchased and used separately in the following time periods:

Unit 1: 5-7 weeks; Unit 2: 6-8 weeks; Unit 3: 3-4 weeks; Unit 4: 4-5 weeks; Unit 5: 5-7 weeks; and Unit 6: 3 weeks.

Intended User Characteristics

Although the materials were written for the average tenth grader, they have utility for grades 7 through 12. Any secondary social studies teacher can successfully implement the course, although background in geography might be helpful.

Rationale and General Objectives

The basic premise of the course is that geography has special ways of looking at the world and at the growing accumulation of facts which help students understand relationships according to a different order and perspective. The major goal of the program is to provide an appropriate educational experience so that students will gain both cognitive and analytic skills.

Content

The four major geographic content approaches (spatial, area studies, man-land tradition, and earth science) are combined throughout and amplified with concepts from all social science disciplines. After working with the content of Unit 5, for instance, students should be able to categorize habitats according to ways in which they have been modified by man, explain why habitats are used differently by people with cultural traditions and technological capabilities, and recognize and interpret the conflict over resources.

Teaching Procedures

Inquiry methods which lead students from evidence to hypotheses are skillfully articulated through the mix of student-teacher interaction which includes collection and evaluation of data, analysis, generalizing, decision-making, and role playing games.

Evaluative Data

The program was evaluated both formatively and summatively in numerous school settings. The data indicates that there was significant student attainment in both the cognitive and affective domains.

Materials and Cost

Unit 5: "Habitat and Resources"

Student Materials:

1 Resources book; 85 pp., 8 1/2" x 10", paperbound	$ 1.20
1 Manual workbook: 20 pp.; in sets of 10	$ 2.40 per set

Teacher's Materials: kit contains
1 Teacher's Guide, 78 pp.; 1 transparency packet; 1 set of role profiles; 3 sets of readings; 15 sets of maps $39.75

NOTE: A copy of The Local Community: A Handbook for Teachers, developed as a supplement to the High School Geography Project materials, was received by the ERIC/ChESS staff too late for entry into this report. It appears, however, to be of great use for high school classes wishing to investigate man-environment relationships in their home communities. The volume contains detailed guidelines for planning, preparing, and conducting a variety of learning activities drawing on many local resources, from telephone books to people.

FIELD SOCIAL STUDIES PROGRAM
WORKING, PLAYING, LEARNING (Grade 1)
PEOPLE, PLACES, PRODUCTS (Grade 2)
TOWNS AND CITIES (Grade 3)
REGIONS AROUND THE WORLD (Grade 4)

Directors: Richard E. Gross, Professor of Education
Stanford University
John U. Michaelis, Professor of Education
University of California at Berkeley

Publisher: Field Educational Publications, Inc.
2400 Hanover Street
Palo Alto, California 94304

Publication Date: 1970

Availability: From publisher

Grade Level: 1-4

Subject Area: Multidisciplinary social sciences

Overview

The Field Social Studies Program is a K-12 program in social studies/social science education based on what the directors describe as an inquiry-conceptual approach to learning. Each of the textbooks reflect the Field Program's basic belief that students must be involved in an inquiry process in order for effective learning to take place. Therefore, each textbook combines inquiry, concept, skill, attitude, and value objectives in structuring the instructional program. Although there are materials available for grades K-12, only those in grades 1-4 deal, to a degree, with environmental education. Working, Playing, Learning is the first-grade component and is based on the premise that first-grade children are able to learn from their daily experiences. Pictures are used extensively to provoke student inquiry. People, Places, Products is the textbook for grade 2 and uses pictures to stimulate inductive investigation of five different types of communities--fishing, grain-farming, cattle-raising, lumbering, and cotton- and garment-producing communities. Towns and Cities, the third-grade component, is structured to attain conceptual, inquiry, skill, and affective objectives. The major content emphasis is on urban communities and how they change. Regions Around the World is a textbook for fourth-grade students which emphasizes the earth as the home of man and the interrelationships between man and his physical-biotic environment.

Required or Suggested Time

Each level of the Field Social Studies Program is designed to form the basis for one year of study in the curriculum. They may, however, be used independently from other components of the Program.

Intended User Characteristics

The materials are intended for average students in these grade levels. The Teacher's Guides provide background reading to accompany each chapter; therefore, no special teacher training is required. Some general background in social science might prove helpful.

Rationale and General Objectives

The directors of the Field Social Studies Program believe that it reflects the very latest research on how children best learn social studies. The basic premise of the program is the inquiry-conceptual approach in which three components--inquiry processes, concepts, and settings--are interlinked to make significant contributions to social studies instruction. The materials constantly stress the interrelationships between concepts from the various social sciences because the directors believe a single-subject approach gives too narrow a view of most areas of concern today. Each part of the Program has four types of general objectives for students to accomplish. Conceptual objectives are concerned with knowledge and understanding of people. Inquiry objectives focus on competence in understanding and using various processes of inquiry. Skill objectives stress language and study abilities related to the social sciences. Affective objectives consist of values, attitudes, and interests inherent in the development and future of society.

Content

The Field Program utilizes concepts from the social sciences throughout the program and is designed to reflect the needs of most school systems in social studies instruction. The specific content emphasis differs at each grade level with the first four levels taking a dominantly multidisciplinary approach to increase the students' sophistication in study and awareness and understanding of themselves and the people around them. The concern with environmental education is particularly felt with the materials for grades 1-4. The first-grade materials, Working, Playing, Learning, include the study of schools, families, and communities, with a resource unit on the study of the earth as a place where people live and interact with the environment. People, Places, Products, the second-grade textbook, deals with the five major types of communities mentioned above by using six lessons for each. The first lesson of each unit deals with the primary industry involving raw materials. The second lesson presents contrasts in secondary industries concerned with product development, while the third lesson shows the lives of people in contrasted countries. The fourth lesson points out problems affecting industrial productivity and the fifth lesson illustrates how science was used to solve problems and improve products. The final lesson in each unit reinforces ideas about similarity and diversity in industry around the world. The resource unit included with the second-grade material is used to develop the students' understanding of the diversity of the earth's regions, both geographically and in relation to man's dependence upon them. The first three chapters of Towns and Cities, the grade 3 textbook,

introduce students to important characteristics of modern American cities. The chapters which follow examine the historic growth of cities and the changes which have taken place in the development of urban areas. The book concludes with an overall examination of problems faced by cities today, aiming at having students feel knowledgeable and responsible for improving cities in the future. The fourth-grade program, Regions Around the World, is based on three broad categories of concepts from the social sciences: learning about the earth as a planet in space; learning about the earth as a variety of physical and biotic landscapes; and learning about the earth as a variety of cultural landscapes. Resource utilization and conservation are examined. Students are encouraged to respect the complexity of the earth and its structure, with a view toward solving its problems.

Teaching Procedures

Each level of the Program includes a Teacher's Guide which offers suggestions for implementation of the materials with a general instructional format. Units are usually initiated by an activity designed to provoke curiosity and provide a focus for inquiry and learning. This activity is followed by developmental activities aimed at involving students in the inquiry process. Students are encouraged to raise questions for themselves and for discussion, and to pursue answers to their questions. Units usually conclude with review or synthesizing activities and suggestions for further individual and group inquiry. The materials can easily be adapted by the individual teacher according to his own teaching preferences. According to the directors, the teacher, regardless of the activity, functions as a catalyst and a co-inquirer in the learning process of the student.

Evaluative Data

Not available.

Materials and Cost

Working, Playing, Learning (Grade 1)
Student Text: Working, Playing, Learning. By Ruth H. Grossman and John U. Michaelis. 144 pp., 8" x 10¼", hardcover $ 2.97
Teacher's Guide: 176 pp., 8" x 10¼", hardcover $ 2.97

People, Places, Products (Grade 2)
Student Text: People, Places, Products. By Ruth H. Grossman and John U. Michaelis. 160 pp., 8" x 10¼", hardcover $ 3.85
Teacher's Guide: 192 pp., 8" x 10¼", hardcover $ 3.15
Multimedia Package: 5 color filmstrips each with a 33 1/3 rpm record; paper posters; 1 Teacher's Guide, 64 pp., 13½" x 10", stapled paper cover; all contained in cardboard box 17½" x 13½" $67.50

Towns and Cities (Grade 3)

Student Text: Towns and Cities. By Phillip Bacon and Ronald Reed Boyce. 256 pp., 8" x 10¼", hardcover	$ 4.14
Teacher's Guide: 352 pp., 8" x 10¼", hardcover	$ 4.14
Multimedia Package: 3 long color filmstrips, each with a 33 1/3 rpm record, titled "Cities Are People," "City Problems," and "People Solve Problems"; 8 short color filmstrips with two 33 1/3 rpm records, titled "Keeping People Healthy," "Fire," "Water Watchers," "Where the Action Is," "People, People Everywhere," "What Shall We Do Now," "Going Places," and "Quiet Please"; paper posters, 1 Teacher's Guide, 64 pp., 13½" x 10", stapled paper cover	$75.00

Regions Around the World (Grade 4)

Student Text: Regions Around the World. By Phillip Bacon. 320 pp., 8" x 10¼", hardcover	$ 4.41
Teacher's Guide: 384 pp., 8" x 10¼", hardcover	$ 4.41
Multimedia Package: 3 long color filmstrips, each with a 33 1/3 rpm record, titled "Man Uses the Land," "The Land Has Many Faces," and "Man Changes the Land"; 9 short color filmstrips, titled "Fiji," "Nepal," "Lapland," "New Zealand," "Portugal," "England," "California," "Alaska," and "Tahiti"; 1 paper map; 1 Teacher's Guide, 64 pp., 13½" x 10", stapled paper cover; all contained in cardboard box 17½" x 13½"	$68.00

COLORADO, UNIVERSITY OF
OUR WORKING WORLD:
Cities At Work
OUT WORKING WORLD:
Neighbors At Work

Director:	Lawrence Senesh Professor of Economics University of Colorado
Project Address:	970 Aurora Avenue University of Colorado Boulder, Colorado 80302
Publisher:	Science Research Associates 259 East Erie Street Chicago, Illinois 60611
Publication Date:	1967 (Revised edition projected for March 1973)
Availability:	From publisher
Grade Level:	2-3
Subject Area:	Economics core Multidisciplinary social sciences

Overview

The Our Working World series is designed to introduce children to the fundamental principles which underlie the functioning of the social world and to relate children's experiences to these principles. Although economics is the core discipline, the other social sciences are an integrated part of the program. The program is designed to introduce children to the analytical tools of the social sciences, their use in discovering cause-effect relationships in society, and the order that underlies our seemingly chaotic world. The child's experiences with the real world are used as points of departure. In the 2nd-grade materials, the children study many kinds of neighborhoods, populated by real people who have likes, dislikes, problems, and hopes. A wide variety of materials and activities is available.

In the 3rd-grade program, children are involved in studying the problems of the city. The intent of these materials is to motivate the children to discover the causes of the major problems that cities face. The children learn what individuals can, what individual volunteers can do, what volunteers working in groups can do, and what citizens working through the political process can do to solve urban problems.

Required or Suggested Time

The course is intended to furnish a full year's work in the social studies. Individual lessons may, however, be taught separately and out of sequence.

Intended User Characteristics

These materials are intended to be used with 2nd-and 3rd-grade students. These students need to have listening skills and be able to read at a 2nd-grade level or above. For inner-city pupils the materials can be used at upper elementary grades. It would be beneficial for the teacher to have a background in economics or the social sciences and to be able to direct discussions in these areas.

Rationale and General Objectives

The purpose of social science education, the author believes, is to develop analytical thinking and problem-solving ability. Students should learn to analyze and understand the structure and processes of society, so that as adults they can participate intelligently in the decisions of a free society.

The rationale for studying the neighborhood in the 2nd-grade from the point of view of the social sciences is that although the neighborhood is small, it presents in microcosm the major forces in our society. For the 3rd-grade materials the author states that because seven out of ten persons in this country live in a city, it is important to introduce the children to the realities of urban life. The general objective is to help children develop modes of analytical thinking useful in understanding the structure and processes of cities.

Content

The materials presented in this series use economics as a core around which the other social science disciplines are clustered. In order to teach something about all the social science disciplines in each year of study, the author has developed the idea of "orchestration" of the disciplines. Under this concept each unit emphasizes a different area of the social sciences. Senesh has also developed the idea of the "organic curriculum," meaning a well-articulated structure of concepts and relationships that are presented in increasing depth and complexity as the child progresses from grade level to grade level.

In the 2nd grade the pupil becomes acquainted with neighborhoods and their many social aspects. The children study the scarcity conflict and how the neighborhood tends geographically, technologically, and occupationally to specialize in order to solve this problem. In one unit the students explore the question of changing neighborhoods by examining how land use, natural disasters, man-land relations affect the neighborhood.

In the grade three materials a multidisciplinary approach is used. The discipline of economics helps the children understand why cities are located where they are, how people earn their livelihood, why and how cities trade, and why some cities grow and others decline. Political science helps the children understand how cities are governed, how use of the land is controlled by rules and laws, and why city governments must worry about such things as poverty, discrimination, and the education of children and adults. The analytical tools of sociology help the children discover what brings people together and what drives them apart in the city. Anthropology helps their understanding of urban life by showing them how tradition hinders the acceptance of new ideas and how science and technology challenge traditional ways. Finally, the analytical tools of geography, including maps, helps students understand how geographic forces dictate the location and trade patterns of cities.

Teaching Procedures

The materials stress the use of a wide variety of techniques and strategies for teaching a given concept. There are many stories and poems included in the student's text of readings and in the teacher's resource unit. Many simulations, dramatizations, role-playing activities, and other activities are suggested in the resource unit, to be used to reinforce and enrich the case studies presented by the recorded lessons in grade two and in the text for all grades.

Records are an integral part of the 2nd-grade materials, and records and coordinated filmstrips are supplementary to the 3rd-grade materials. In grade two it is suggested that the teacher open the lesson by playing the appropriate record while the pupils look at the two-page illustration. Then the children take an imaginary trip while looking at two pages of sequential photographs. Next a short story is read by the children, and finally consideration is given to what has been learned. The suggested procedure in the 3rd grade is to have the children first read a concept unit to get an idea of important aspects of a city. After they have read the unit, the teacher raises questions for discussion. Next, in order to help the children discover characteristics of cities in real life situations, the teacher has the pupils read a case study. An inquiry into the nature of the city follows. After that the teacher reads a poem or short story to the children and concludes with a discussion. If the teacher so desires, he can reinforce what was learned in the sequence with role-playing activities, games, plays, and other exercises from the resource unit.

Evaluative Data

Not available.

Materials and Cost

Grade 2:

Student Text: Our Working World: Neighbors at Work. By Lawrence Senesh. 191 pp., 10¼" x 8¼", clothbound	$ 3.45
Student Activity Booklet: Our Working World: Neighbors at Work. 63 pp., 11" x 8½", stapled paper cover	$ .79
Teacher's Resource Unit: Our Working World: Neighbors at Work. 296 pp., 11-1/3" x 8-3/4", spiral bound paper cover	$ 5.25
Record Album: 12½" x 11½" x 2"; fifteen 33-1/3 rpm records; loose-leaf binder; record transcript booklet, 46 pp., 8" x 10"	$25.00

Grade 3:

Student Text: Our Working World: Cities at Work. By Lawrence Senesh. 287 pp., 10-1/6" x 8", clothbound	$ 3.75
Student Activity Booklet: Our Working World: Cities at Work. 80 pp., 11" x 8½", stapled paper cover	$ .87
Teacher's Resource Unit: Our Working World: Cities at Work. 263 pp., 11½" x x 8½", spiral bound paper cover	$ 5.25
Record-Filmstrip Set: Twelve 33-1/3 rpm recordings; 12 coordinated filmstrips; record transcript booklet, 49 pp., 8" x 10"; set contained in a 21" x 10" x 2" cardboard carton	$90.00

RHODE ISLAND COLLEGE
PROVIDENCE SOCIAL STUDIES CURRICULUM

Director:	Ridgway F. Shinn, Jr.
Project Address:	Rhode Island College Providence, Rhode Island 02908
Publisher:	Rhode Island College Bookstore 600 Mt. Pleasant Avenue Providence, Rhode Island 02908
Publication Date:	1969
Availability:	From publisher
Grade Level:	K-12
Subject Area:	History, Geography

Overview

This K-12 curriculum represents an interdisciplinary approach to social studies utilizing geography (1-8) and history (9-12) as the organizing disciplines. Primary reliance is placed on commercially available texts, pamphlets, and audio-visual aids, etc., which are coordinated to the resource units which the project has prepared. The curriculum is based on a new-world view of society in which the students are expected to examine the human condition from a broad global perspective.

Required or Suggested Time

Each curriculum guide provides firm suggestions for the timing of individual units; however, a school system could use and adopt selected portions of the curriculum.

Intended User Characteristics

The materials have been designed particularly for the inner-city disadvantaged child. They do not seem appropriate for the slow learner. Teachers would benefit if given inservice training.

Rationale and General Objectives

The developers feel that the inner-city child often has been presented irrelevant materials which encompass values which are substantially at odds with the values of his own subculture. He is also often taught by teachers with negative attitudes toward him. After an extensive appraisal of the demographic characteristics of Providence, materials were designed which have high motivational impact because they are reflective of the students' needs and interests. Students are

expected to gain in both the cognitive and affective domains. Examples of stated objectives are to develop an understanding of the world, democratic values, and worth of the individual. Students are also expected to develop adequate social studies skills.

Content

The units from grades four, ten, eleven, and twelve seem the most useful to supplement an environmental education course. Grade 4, "A Type Study of Regions," includes the "Overview"; "The Nature and Characteristics of Metropolitan Regions"; "Regions of Extractive Economic Activities"; and "Regions of Manufacturing Activity." Grades 10 and 11 cover "American Studies," and include "Growth and Territorial Growth in the United States," "Development of Society in the United States," "The Development of the United States' Economic System," "United States Political Development," and "United States in the Contemporary World." Grade 12, "Issues in Contemporary Societies," deals with "Development Issues," "Power Issues," and "Social Issues."

Teaching Procedures

The concepts, aims, and skills which the curriculum intends to develop are stated for the teacher along with suitable questions to assist the students in reaching what are considered to be the important generalizations. Teachers are cautioned to treat the materials openly and to answer student-generated questions as fully as possible. The pace of the class and the particular materials and activities chosen are left to the discretion of the teacher, depending on the needs of the class.

Evaluative Data

The data indicates that students in the Providence schools who used this material had much more positive attitudes toward social science than students in a control group. There is some evidence that the curriculum works better with above-average students than with slow learners.

Materials and Cost

All of the materials are mimeographed and staple-bound, with a paper cover.

Kindergarten	
Curriculum Guide, K-3, and Resource Units, K	$ 2.95
Grade 1	
Curriculum Guide, K-3, and Resource Units, 1	2.95
Grade 2	
Curriculum Guide, K-3, and Resource Units, 2	2.95
Grade 3	
Curriculum Guide, K-3, and Resource Units, 3	3.50

Grade 4	
Curriculum Guide, 4-7, and 4 Resource Units	$ 6.45
One copy of each Curriculum Guide and all Resource Units, K-12	$52.80
Grade 5	
Curriculum Guide, 4-7, and 6 Resource Units	$ 8.80
Grade 6	
Curriculum Guide, 4-7, and 6 Resource Units	$ 8.80
Grade 7	
Curriculum Guide, 4-7, and 4 Resource Units	$ 6.45
Grades 8 and 9	
Curriculum Guide, 8-12, and 7 Resource Units	$10.25
Grades 10 and 11	
Curriculum Guide, 8-12, and 6 Resource Units	$ 9.00
Grade 12	
Curriculum Guide, 8-12, and Resources for 15 Issues	$ 5.25

SOCIAL ISSUES RESOURCE SERIES
"Population"
"Pollution"

Director:	Eleanor Goldstein
Project Address:	Exotech Systems, Inc. 525 School Street, S.W. Washington, D.C. 20024
Publisher:	Same as project
Publication Date:	January 1972
Availability:	From project
Grade Level:	10-12 (7-9)
Subject Area:	Problems of Democracy

Overview

These volumes are two of ten projected looseleaf volumes on social issues; each volume will have semi-annual supplements. Other volumes of interest for environmental education will include "Transportation" and "Urbanization." Careful selection of articles gives a broad coverage of the topic and of opposing viewpoints. The materials are designed for flexible classroom use, stressing student initiative and teacher support in the selection of topics, formulation of questions, and analysis of data and issues.

Required or Suggested Time

Each volume is designed to take from 3 to 6 weeks, depending on the teaching methods employed, if used daily in a single class. Single articles or selections of articles can be used independently in social studies or in other courses.

Intended User Characteristics

Designed particularly for senior high students, the materials may also be used at the junior high level. If suggested teaching procedures are followed, the teacher must be willing and able to assume a role that is supportive to and facilitative of student inquiry.

Rationale and General Objectives

The author's premises include the beliefs that "the study of socially significant issues should be a central, rather than peripheral, part of the school curriculum," that periodicals "fulfill an important function in selecting, distilling, interpreting, placing in perspective, and presenting a balance of ... subjects," and that high school students can

be motivated to select and formulate their own learning activities, with the assistance of an open and supportive teacher. The major goals of the program are to develop student initiative in formulating important social questions, in analyzing and weighing data and conclusions of others, and in participating intelligently in discussions of the issues.

Content

The volume on pollution contains articles dealing with various kinds of pollution (air, water, noise, thermal, etc.), the effects of pollution (on health, wildlife, etc.), the dangers of underestimating as well as overestimating the consequences of the problem, cost of pollution and pollution control, case histories, and government policies.

The volume on population deals with the problems of both overpopulation and underpopulation, migration, the relationships of population policy to imbalances in the power and position of minorities, food and hunger, Zero Population Growth, population history and census data, futurism, and government policies.

Teaching Procedures

Student initiative with teacher support is suggested in selection of topics and articles, formulation of issues and questions, construction and use of models, class discussion, handling data, research, and evaluation.

Evaluative Data

The method and materials were developed and tested over a 5-year period in the author's classroom. No further evaluative data are available.

Materials and Cost

Pollution volume:	
Student Materials:	
60 different articles in looseleaf binder	$ 30.00
Semi-annual Supplement, 20 articles	approximately $ 10.00
Teacher Materials:	
Teacher's Guide: approximately 20 pp.,	Included with Student Materials.
Population volume:	
Student Materials:	
60 different articles in looseleaf binder	$ 30.00
Semi-annual Supplement, 20 articles	approximately $ 10.00
Teacher Materials:	
Teacher's Guide: approximately 20 pp.	Included with Student Materials

SOUTH CAROLINA, STATE DEPARTMENT OF EDUCATION
CONSERVATION CURRICULUM IMPROVEMENT PROJECT
"People and Their Environments"

Director:	Albert H. H. Dorsey, Coordinator Matthew J. Brennan, General Editor
Project Address:	State Department of Education Columbia, South Carolina 29201
Publisher:	J. G. Ferguson Publishing Company 6 North Michigan Avenue Chicago, Illinois 60602
Publication Date:	1969
Availability:	From publisher
Grade Level:	1-12
Subject Area:	Conservation core Economics, Geography, History, Political Science, Sociology

Overview

The materials for "People and Their Environment" were prepared by the Conservation Curriculum Improvement Project, administered by the South Carolina Department of Education in cooperation with the School of Education, University of South Carolina, and the South Carolina Advisory Council for Conservation Education, and funded by the Belle W. Baruch Foundation. The materials, which are primarily curriculum guides, suggest an approach to the teaching of conservation as an integral part of various subject matter areas at all levels of education. The material is designed for use by teachers and curriculum workers. These teacher's manuals include suggestions for lesson topics, suggested readings, and suggested instructional materials. They are directed to stimulate teachers to improve instructional procedures so as to provide experiences for students which will create interest and concern for their future interaction with their environment.

Required or Suggested Time

The lessons suggested in these guides are very flexible in time use. They vary from one day to activities which can be used throughout the year.

Intended User Characteristics

All of the guides have been designed to supplement existing curricula in a variety of subject areas from primary through high school grades. Teachers are encouraged to adapt the materials to meet their needs and

the needs of their students. Since most lessons are in bare outline form, teachers will have to do considerable work to utilize the "average" lesson.

Rationale and General Objectives

This series of guides is an attempt to provide a program of action--a series of curriculum experiences--with the interdependence of all living things with one another and with their environment as the underlying conceptual scheme. The major goal of the materials is man's recognition of his interdependence with all of life and his environment. The guides are designed around three major concepts: 1) living things are interdependent with one another and with their environment, 2) organisms (or populations of organisms) are the product of their heredity and environment, and 3) organisms and environments are in constant change.

Content

The basic organizer of these multi-disciplinary materials is conservation or the judicious utilization of resources. The concepts apply equally well for any subject area. The science concept "an organism is the product of its heredity and its environment" becomes "the family or the community is the product of its culture (heredity) and the rules under which it must operate (environment)" in the social studies. The three major concepts in the materials are developed to increasing complexity in the upper grade levels.

Teaching Procedures

The teaching strategies outlined in these guides include a wide variety of student activities and learning experiences. There are many suggested outside readings for students and audio-visual materials for teachers. There is much cooperative group work suggested as an important part of the learning experience.

Evaluative Data

Not available.

Materials and Cost

Teacher's Curriculum Guide to Conservation Education, Grades 1-2-3: 152 pp., 8" x 12", paperbound	$ 3.50
Teacher's Curriculum Guide to Conservation Education, Grades 4-5-6: 177 pp., 8" x 12", paperbound	$ 3.50
Teacher's Curriculum Guide to Conservation Education, Grades 7-8-9: 134 pp., 8" x 12", paperbound	$ 3.50
Teacher's Curriculum Guide to Conservation Education, Social Studies, Grades 10-11-12: 110 pp., 8" x 12", paperbound	$ 3.50

ELEMENTARY ECONOMICS PROJECT
INDUSTRIAL RELATIONS CENTER
UNIVERSITY OF CHICAGO
Economic Man

Director:	William D. Rader
Project Address:	Industrial Relations Center University of Chicago Chicago, Illinois 60637
Publisher:	Benefic Press 10300 West Roosevelt Road Westchester, Illinois 60153
Publication Date:	1971
Availability:	From publisher
Grade Level:	6-8
Subject Area:	Economic core Geography, Political Science, and Sociology

Overview

These materials for 6th- through 8th-grade students were developed by the Industrial Relations Center at the University of Chicago with a grant from the Charles Stewart Mott Foundation. They are intended as a supplement to a 6th-, 7th-, or 8th-grade course or as a self-contained year-long course in economics. The materials are designed to lead the students to establishment of an economic system on a simulated South Pacific Island, a study of the market, a hypothetical trade situation between the United States and Canada, and a changing trade pattern between Malaysia and Brazil. The simulation game, Market, is an integral part of the course but is also sold separately.

Required or Suggested Time

These materials were designed for an extensive 24-week course in economics. If the market game is omitted, the course of study will take approximately 20 weeks. Some, but not all of the parts of the course, can be taught separately and out of sequence.

Intended User Characteristics

These materials were designed for students in grades 6 through 8. Students of diverse abilities should do well with these materials in a regular social studies classroom situation. The ability of the teacher to pose and sequence questions will be a major factor in determining the success of the program. In addition, the teacher needs to be flexible

and resourceful. The teacher should also have a general social science background.

Rationale and General Objectives

In the Teacher's Resource Guide the director states, "We believe the eleven-or-twelve-year-old child is capable of and interested in grappling with abstractions, provided he can detect their resemblance to reality. At this age, children want to better understand their world; they want to be challenged by their educational experiences."

The general objectives of the materials are for students: 1) to learn small group skills; 2) to be sensitive to what constitutes economic behavior; 3) to view economic behavior with more concern; 4) to retain some economics concepts and generalizations; 5) to have an awareness of how the social scientist creates knowledge for his own use; 6) to have an awareness that practicing economists use data which is organized in tables and graphs; and 7) to improve their ability to read graphs and tables.

Content

The basic structure of the economic content of these materials is the premise that unlimited wants versus limited resources make choice-making necessary. Decisions have to be made as to how to effectively use resources and determine the priority of wants. This choice-making role must be played in using the natural resources of the environment. While the content is primarily economics, the materials introduce such concepts as the management and use of resources (both human and natural), man-land relationships and the allocation of scarce resources.

Teaching Procedures

Unit One serves as a general introduction to the three types of economic behavior discussed in the program: production, exchange, and consumption. It contains a story about two shipwrecks on an imaginary island. Written exercises, small group activities, and role playing are woven into the study. In Unit Two the students are involved in a simulation game called Market. Some students buy goods while others sell goods, discovering economic concepts of price theory. It shows how the market mechanism controls production. Unit Three presents two case studies in international trade which help the students learn to apply economic concepts to real world situations.

Evaluative Data

Several field tests have been carried out to date. The last one (1969-1970) included rural, urban, and suburban children and investigated the feasibility of using the program in all of the upper elementary grades. These reports are available from the project.

Materials and Cost

The Economic Man program includes Teacher's Editions of the student texts, Student Texts, a Teacher Resource Unit, Teacher's Guide to Daily Lessons, and the Market game.

Student Text:
Economic Man: Producer and Consumer: Book I. By Katherine Esch Chapman et al. 122 pp., 8½" x 11", stapled paper cover $1.96
Economic Man: Buyer and Seller: Book II. By William D. Rader et al. 136 pp., 8½" x 11", stapled paper cover $1.96

Teacher's Editions:
Economic Man: Book I. 122 pp., 8½" x 11", stapled paper cover $1.96
Economic Man: Book II. 136 pp., 8½" x 11", stapled paper cover $1.96

Teacher's Resource Unit:
Economic Man: Teacher Resources. 77 pp., 8½" x 11", stapled paper cover $1.96

Teacher's Guide:
Economic Man: Teacher's Guide to Daily Lessons. 83 pp., 8½" x 11", stapled paper cover $1.96

Market Game materials:
Coordinator's Manual, Retailer and Consumer Envelopes, Food Cards, Paper Money, Coins, Score Sheets, Lists. $48.00

Supplementary Coordinator's Manual: 56 pp., 8½" x 11", paperbound; for use with game if game is used separately $ .80

Supplementary Student Manual: 32 pp., 8½" x 11", paperbound; for use with game if game is used separately $ .48

CARNEGIE-MELLON UNIVERSITY
SLOW LEARNER PROJECT
Americans in Cities

Directors:	Edwin Fenton Anthony N. Penna
Project Address:	Social Studies Curriculum Center Carnegie-Mellon University Schenley Park Pittsburgh, Pennsylvania 15213
Publisher:	Holt, Rinehart, and Winston, Inc. 383 Madison Avenue New York, New York 10017
Publication Date:	Summer 1972
Availability:	From publisher
Grade Level:	9
Subject Area:	Urban Studies

Overview

Americans in Cities is a one-year urban studies course which has been designed for the ninth grade slow learner. The program emphasizes the affective domain and concentrates on improving a healthy self-concept, while strengthening study and analytic skills. Primary sources, newspaper accounts, maps, etc., are utilized to teach necessary concepts and various aspects of urban life.

Required or Suggested Time

The materials are designed for a one-year course in ninth grade urban studies. The course is divided into 18 chapters, each requiring approximately 2 weeks of class time. The lessons are ordered chronologically and should be taught sequentially.

Intended User Characteristics

The materials were written for the ninth grade slow learner between the ages of 14 and 16 with a reading level between the 4th and 7th grades and an I.Q. between 75 and 90. The teacher needs a background in social studies and a sympathetic attitude toward slow learning students who are alienated from learning and school.

Rationale and General Objectives

The developers feel that slow learners can learn when learning tasks are appropriate to their abilities and aspirations. These learners have special characteristics which become clearly apparent when they must

cope with the traditional, narrative text and the lecture-recitation approach to teaching social studies. Frustrations quickly arise with difficult vocabulary, reliance on the printed word, and the use of high level abstractions and generalizations. For the slow learner, then, priorities have been revised. Developing a positive self-concept, positive attitudes toward learning, clarification of values and the development of inquiry skills get the major attention before the students are given an opportunity to develop social studies skills and apply social studies terms and concepts.

Content

Americans in Cities is designed to stimulate slow learners to understand that twentieth century America has become fundamentally urban. Urbanization not only has demanded that man create new and different social economic, and political patterns to deal effectively with complex human problems, but has also created greater opportunities for individual growth and achievement.

Concepts from political science, economics, geography, sociology, and history are introduced to help student examine specific aspects of urban society such as housing, public safety, transportation, welfare, and municipal government. The materials are structured to encourage students not only to inquire about the urban problem being presented, but also to identify, clarify, and develop their own personal attitudes toward the problem. Students should be able to better cope with the metropolitan environment because they understand it as highly diversified and complex phenomenon.

Teaching Procedures

Teaching strategies are centered around teacher-directed student discussion designed to facilitate learning of content, organizing of data, hypothesizing, and finally evaluating. Value discussion is considered an integral part of the classroom experience.

Evaluative Data

Not available.

Materials and Cost

Materials will be available in the summer of 1972; projected costs are not available.

AMERICAN ASSOCIATION FOR HEALTH, PHYSICAL EDUCATION, AND RECREATION
NATIONAL EDUCATION ASSOCIATION
ASSOCIATION OF CLASSROOM TEACHERS
Man and His Environment, An Introduction to Using Environmental Study Areas

Director:	Sidney Dorros
Project Address:	National Education Association Publications-Sales Section 1201 - 16th Street, N.W. Washington, D.C. 20036
Publication Date:	1970
Availability:	From publisher
Grade Level:	Teacher's material for use K-12
Subject Area:	Interdisciplinary

Overview

By presenting an interdisciplinary approach to environmental education, this booklet is intended to help teachers expand their classrooms to include all of man's environment. Through the use of environmental study areas selected for their environmental potential, a student is encouraged to develop an awareness of his environment that will lead to a personal sense of involvement and the shaping of an environmental ethic.

Required or Suggested Time

No time specifications are indicated. The activities may each be used for a period from one to several days.

Intended User Characteristics

The materials were designed for use with the NEED and NESA programs which were originally intended for use with inner city children. However, the materials are appropriate for use with students K-12 and for a wide range of programs.

Rationale and General Objectives

The stated objectives are those indicated by the National Park Service as the principal objectives of an environmental study area program: 1) To introduce the student to his total cultural and natural environment, past and present, and help him realize that he is a part of it. 2) To develop in the student an understanding of how man is using and misusing his resources. 3) To provide an opportunity for the student

to work directly with environmental problem solving. 4) To equip the student to be a responsible member of the world that he is shaping and that is shaping him.

Content

The booklet provides the teacher with information on the background of environmental study area programs, suggestions for selecting sites and planning programs, aids to identifying the educational possibilities of a site and preparing lessons related to them.

Sample learning activities using the five strands - Variety and Similarities, Interaction and Interdependence, Continuity and Change, Evolution and Adaptation - are included for Art, Mathematics, Science, Social Studies, and Communications. Lesson suggestions and discussion questions are presented for each activity.

Teaching Strategies

The developers recommend the strand approach, utilizing the five strands noted above, which incorporates both the specific, or taxonomic, and the investigative approaches. This requires identification and classification but on a modified basis, and also requires open ended investigation leading to problem solving.

Evaluative Data

The materials were process-evaluated by trial testing with the NEED and NESA programs and by expert review. Evaluative data are currently not available.

Materials and Cost

Teacher's materials:

Man and His Environment. 58 pp., 7" x 10"; stapled paperbound booklet	$1.75

BIOLOGICAL SCIENCES STUDY COMMISSION
BSCS GREEN VERSION: HIGH SCHOOL BIOLOGY

Project Address:	BSCS University of Colorado Boulder, Colorado 80302
Publisher:	Rand McNally and Company
Publication Date:	1968
Availability:	From publisher
Grade Level:	9 - 12
Subject Area:	Biology

Overview

Approximately one half of this edition of the BSCS Green Version is devoted to environmental education. Moving from the concrete to the abstract, from the individual organism to the ecosystem, a background for the study of inter-relationships of organisms is laid. Patterns of life of macroorganisms on land and in the water are examined as are life patterns of microorganisms. The final section focuses on man's role in the interaction of organisms which comprise the web of life. Use of the inquiry approach is prominent throughout.

Required or Suggested Time

The BSCS Green Version is intended as a year course; although only half of the content is oriented toward environmental education, the skillful teacher could spend more or less time in this area.

Intended User Characteristics

This edition is intended for the middle 60 percent of tenth grade students but can be easily modified for use in grades 9 through 12. Suggestions for further problems and readings can be adapted for the upper range of students; students in the lower 20 percent of the class would have some difficulty in handling the text material.

Rationale and General Objectives

Recognizing that the great majority of high school students take biology and that this will be the last science course for a large number of other students, the BSCS Green version seeks to provide the student with a science background that will be useful to him as a member of society. Encouraging a scientific viewpoint in the student, the text works to develop an understanding of the interrelationship of all organisms and particularly man's own place in this interrelationship.

Content

Three sections in this text deal with environmental education - Section One: The World of Life: The Biosphere (Chapters 1 - 3), Section Three: Patterns in the Biosphere (Chapters 7 - 10), and Section Six: Man and the Biosphere (Chapters 19 and 20). Much of this material is strictly ecological with environmental problems playing a minor role; however, the final section deals with the effects of man on the environment and the problems that man now faces.

Teaching Procedures

The material is oriented toward scientific inquiry with student investigations inserted at pertinent points in the text. A comprehensive teacher's guide provides background information and suggestions. Class discussions and problem-solving sessions should play a major role.

Evaluation Data

Evaluation of the BSCA Project can be obtained through the Science and Mathematics Education ERIC Center.

Materials and Cost

Student Text (with lab investigations)	$ 7.35
Teacher's Guide (with lab investigations)	3.30

INTERACTION SCIENCE CURRICULUM PROJECT
Interaction of Man and the Biosphere

Director:	Norman Abraham
Project Address:	Interaction Science Curriculum Project Rand McNally and Company Chicago, Illinois
Publisher:	Same as project
Publication Date:	July, 1970
Availability:	From project
Grade Level:	6-9
Subject Area:	Science

Overview

This volume offers the student the opportunity for acquiring the knowledge necessary to understand man's place in the biosphere and his biological heritage. Topics within the text are not independent. Continuity is maintained from one section to the next. Each topic is accompanied by a series of laboratory investigations. Most of the student's time is to be spent in laboratory sessions; raising questions, observing, conducting investigations, collecting and interpreting data, and drawing conclusions. Students are encouraged to maintain their own careful record of laboratory activities.

Required or Suggested Time

Intended for an academic year of study.

Intended User Characteristics

The publication is designed for junior high school students. If suggested teaching procedures are followed the teacher must act as a guide and facilitator in the highly structured program of student inquiry.

Rationale and General Objectives

In order to intelligently use and apply technology the student must study "interactions among living things, interactions between living things and the nonliving environment, and the significance of these interactions to the continuing existence of life on this planet." Science is a creative activity thus, the study of interactions must be accomplished through student inquiry.

Content Related to Environmental Education

Section One: Life in the Biosphere - Photo essays of air pollution, junk yards, soil erosion, and undisturbed woodlands

are presented to the student as scenes from an imaginary planet. Students are asked to describe their impressions of the scenes and also how the inhibitants of planet X probably feel about their environment.

Section Six: Internal Balance - Students are asked to describe environmental conditions that disrupt the internal balance of man and other organisms and how the biosphere can be maintained as a fit place to live.

Section Seven: Man and Nature - The impact of man's activities through the centuries is described. Evidence of man's activities takes many forms. Activities such as chemical, thermal, noise, and solid-waste polution are emphasized and related to "environmental quality rating" in the students' community. Student investigations involve the interpretation of local population problems, the establishment of environmental priorities, and participation in mock environmental hearings.

Section Eight: Ecological Interaction - In a population how is biotic potential related to environmental resistance? How has man attempted to raise or lower environmental resistance? Investigations involve ecological interactions.

Teaching Procedures

Textbook readings are followed by laboratory investigations and student discussions.

Evaluation Data

The publication has been tried, evaluated, and revised several times through the assistance of numerous teachers, students and educators.

Materials and Cost

Student text in hardback (when buying 30 copies), each	$5.22
Teacher edition in paperback, free with class order	
Achievement tests:	
Quarterly (for 30 students)	$27.00
Final, combined forms A & B forms (for 30 students)	$13.95
Answer sheets (128)	$ 4.95
Kits:	
Nonconsumable (for 30 students)	$340.00
Consumable (for 30 students)	$80.00

ADDISON-WESLEY PUBLISHING COMPANY INC.
Air Pollution
Water Pollution
Noise Pollution

Authors:	Charles W. Lavaroni, Patrick A. O'Donnell, Lawrence A. Lindberg
Consultant:	Milton Feldstein, Director of Technical Services Bay Area Air Pollution Control District San Francisco, California
Publisher:	Addison-Wesley Publishing Company Inc. Menlo Park, Calif.--Reading, Mass.
Publication Date:	1971
Availability:	From publisher
Grade Level:	Grades 7 - 9
Subject Area:	Science

Overview

This is a set of three booklets written for students with suggestions to teachers. Designed to help teachers guide the development of ideas, skills, attitudes, and processes of scientists and science in junior high school students, these booklets present information and suggested activities for the study of pollution problems.

Required or Suggested Time

No time specifications are indicated. Each of the booklets provides sufficient information and activities to be used for a period of weeks, if sufficient student interest develops.

Intended User Characteristics

The materials do not appear to have been designed for any specific junior high school student population. Although they are aimed at the junior high school level, these materials could also be used with upper elementary school classes.

Rationale and General Objectives

These materials are designed to promote the development of the scientific enterprise in junior high school students while also making them aware of pollution problems in their environment.

Content

Each of the three booklets is organized into four chapters in the following format. Chapters one and two present the problem to be studied (air pollution, water pollution, or noise pollution) and background information. Chapter three contains suggested student investigations. Chapter four lists additional questions to be answered and supplementary investigations.

Many of the suggested student investigations in the booklets on air pollution and water pollution will be familiar to teachers of general science. The student activities in the noise pollution booklet appear to have been developed or adapted for this area although some activities, on sound and pitch, come from general science textbooks.

Teaching Strategies

In a page of "notes to the teacher," the authors suggest that the teacher decide upon the most effective use of the booklets. They do present an alternative strategy to that of proceeding through the booklet chapter by chapter. This is to move immediately to chapter four, using chapters two and three as data sources while the students conduct their investigations.

Evaluative Data

None are available at present. These materials have just been put on the market.

Materials and Cost

Student materials, with teachers' editions:

Air Pollution, 94 pp., 6½" x 9", stapled paperbound booklet	$1.68
Water Pollution, 94 pp,, 6½" x 9", stapled paperbound booklet	$1.68
Noise Pollution, 94 pp., 6½" x 9", stapled paperbound booklet	$1.68

SCIENCE CURRICULUM IMPROVEMENT STUDY (SCIS)

Director:	Robert Karplus
Project Address:	Lawrence Hall of Science University of California Berkeley, California 94720
Publisher:	Rand McNally & Company
Publication Date:	1968 through 1970
Availability:	From publisher
Grade Level:	Elementary
Subject Area:	Science

Overview

SCIS was established in 1962 by Karplus as a result of his work with the Elementary School Science Project (ESSP); that experience led Karplus to the conclusion that science had to be simplified for the elementary school and organized on a different basis from traditional logical subject matter presentations. Using the groundwork of Piaget, Bruner and others, SCIS concluded that the elementary school years should provide:

1. A diversified program based heavily on concrete manipulative experiences.

2. These experiences in a context that helps to build a conceptual framework.

3. A conceptual framework that permits children to perceive phenomena in a meaningful way.

Thus, SCIS has considered cognitive, affective, and psychomotor domains.

Required or Suggested Time

No specific time dimensions are given for the various units, though guidelines recommended for various studies encompass time dimensions from one to several weeks. Recommendations are made for sequencing and grade-level placement.

Intended User Characteristics

Materials are designed for the full range of elementary students. No particular suggestions are given for varying ability levels.

Rationale and General Objectives

Among the objectives of SCIS are intellectual development, scientific literacy, decision-making and development of favorable pupil attitudes toward science. The belief that the concept of literacy is the principal objective of teaching science in the elementary school permeates the entire program.

Content

As indicated above, SCIS is primarily an elementary science program which might, if completely implemented, comprise the total science program through the elementary years. The concepts around which the materials have been developed are representative of the "big ideas" of science, including organism, ecosystem, matter and energy, property, reference frame, system, and model. Thus a conceptual framework is organized, cutting across traditional disciplines and forming a structure that illustrates the unity of the sciences. Physical and Life Science Sequences are developed in parallel modes.

With respect to environmental education materials, the last four segments of the Life Science Sequence are of interest. They are:

Populations	Communities
Environments	Ecosystems

For each, both student booklets and teacher guides are available, along with materials kits for student use in carrying out activities-- as might be suspected, stress is laid on psychomotor approaches to develop both concepts and attitudes. Specific activities are recommended and well-developed to "fit" into the total scheme.

Teaching Procedures

As indicated above, the normal approach to learning is through student activity. Use of the teachers' guides becomes essential; it may be possible to design other student guides and/or laboratory materials to replace those designed by the program, though not without considerable effort.

Evaluative Data

A number of studies have been conducted, some of which have resulted in modifications of program and materials. Generally, the studies indicate positive results of SCIS with respect to the meeting of its objectives.

Materials and Cost

Population. 1967, 8½" x 11"; paperbound, stapled; Teacher's Guide	$2.00
Environment. 1968, 8½" x 11"; paperbound, stapled; Teacher's Guide	$3.00
Student's Guide	$0.65
Communities. 1971, 8½" x 11"; paperbound, stapled; Teacher's Guide and Student's Guide	$2.00
Ecosystems. 1971, 8½" x 11"; paperbound, stapled; Teacher's Guide and Student's Guide	$2.00

EKISTICS

Director: Rudolph J. H. Schafer

Address: Consultant in Conservation Education
California State Department of Education
State Education Building
721 Capitol Mall
Sacramento, California 95814

Grade Level: 1-12

Subject Area: Environmental Education

Overview

Current developments in the field of environmental education have made it clear to most educators that some basic rethinking and restructuring of the curriculum is very much in order if we are to help students develop the skills, attitudes, and knowledge they will need to participate intelligently in the decision-making process concerning the environment and its resources. The State of California is well into such a process, and has prepared a publication titled "Ekistics-A Guide for Conservation and Environmental Studies Curriculum Development" which has been developed under the direction of Dr. Paul Brandwein. The need for the new curriculum guide was officially recognized in 1968 when the California Legislature mandated that "wise use of natural resources and man's relations to his human and natural environment" be taught in appropriate grade levels and subject areas in grades one through twelve in California schools. In 1969, the Report of the Conservation Education Advisory Committee to the State Board of Education recommended that the State Department of Education develop a curriculum outline showing California educators how this legislative-mandate could be implemented.

In mid-1970, arrangements were made enabling Brandwein and a carefully selected project team to develop a first draft of the publications. This first draft has been printed and distributed on a limited basis for review and comment. A final publication version will be produced as soon as possible for printing and distribution by the Department of Education.

The draft version runs some 251 pages and includes a statement of rationale, conceptual outlines, together with explications of the concepts, performance objectives, a discussion of instruction and teaching, and a bibliography.

Rationale, General Objectives, and Description

What behavioral changes are to result from this new curricular approach? "The aim is to produce those changes in human concepts and values," Brandwein states, "which will result in behavior which demonstrates recognition in word and deed by the student that he is interdependent with his environment, and that he supports a culture which sustains a sanative (healthy) environment." In order to develop these behavioral patterns, Brandwein and his team have developed a conceptual guide for the elementary grades involving three cognitive affective schemes:

1. Man is interdependent with his natural and physical environment.
2. Man's social behavior is basic to maintaining, altering, adapting, or destroying the environment.
3. Man utilizes his symbolic and oral traditions to maintain or alter the environment.

In terms of traditional subject matter areas, it will be noted that, although the areas of (1) science, resource technology, and health, (2) the social sciences, and (3) the arts and humanities are principally concerned, there are vast implications for other subject areas, and environmental studies could well become the community of discourse for the entire elementary curriculum.

Moving on to the junior high level, it is suggested that a unit of work based on four cognitive-affective schemes be included in these four curricular areas: (1) social science, (2) science, (3) humanities, and (4) health. Environmental education implications in other subject areas would also be stressed. The cognitive-affective schemes for junior high are: (1) Societies perceive environmental issues of their time on the basis of past experience, (2) the interaction of the culture with available technology determines the nature of the environment which is planned and developed, (3) social issues and decisions alter the environment, and (4) social issues and decisions determine the utilization of all resources.

At the high school level, the interdisciplinary effort would continue, and a one-year course would be introduced to bring together, refine, and extend all of the skills, attitudes, and knowledge developed earlier and apply them to the solving of contemporary environmental problems. The high school cognitive-affective schemes include: (1) in any given environment, organisms are linked within an ecosystem, (2) issues and decisions affecting the world ecosystem reflect the pressure of population upon resources, (3) wise utilization of the environment is dependent on the organization of shortage, and (4) the concepts and values man accepts as guides to his future behavior determines the quality of his life, if not his survival.

Evaluation

None available

Materials Available

Information on current materials can be obtained from the ERIC Center for Science, Mathematics, and Environmental Education, 1460 West Lane Avenue, Columbus, Ohio 43221.

EDUCATION DEVELOPMENT CENTER
Man: A Course of Study

Director:	Peter B. Dow
Address:	Education Development Center Cambridge, Massachusetts
Availability:	Curriculum Development Associates, Inc. Suite 414 1211 Connecticut Ave., N.W. Washington, D.C. 20036
Grade Level:	4 - 6
Subject Area:	Social Studies

Overview

This set of materials is a part of the Social Studies Curriculum Program of the Education Development Center, Cambridge, Massachusetts, and is designed for use in the upper elementary grades. The materials are based on three questions: What is human about human beings? How did they get that way? and How can they be made more so?

Required or Suggested Time

Intended for an academic year of study.

Intended User Characteristics

The materials have not been designed for any specific target group. However, the materials are available only after teachers have participated in workshops.

Rationale and General Objectives

This innovative set of materials is written to help students explore some basic ecological considerations about man and animals in the web of their relationships to their environment.

Content

Exploratory materials concern the roots of man's social behavior through the study of selected animal groups and an intensive examination of a remote society very different from our own. Several weeks' work is devoted to the Netsilik Eskimos. The direct dependence upon

the Arctic animal life for food, tools, clothing, and shelter; the hazards of exposure; and the variables beyond man's control come through to students. Comparisons with the students' more remote dependence on and greater protection from the environment are encouraged. Questions and activities on the quality of life, the quality of the environment, the effects of industrialization and urbanization could be designed to follow the Netsilik activities effectively.

Man: A Course of Study depends heavily on motion picture films with printed materials in support.

Teaching Procedures

Special teacher training in the use of the materials is recommended. The materials are elegant and exciting, but the approach is overly prescribed.

Materials and Cost

Information on materials and prices can be obtained from:

Education Development Center, Inc.
55 Chapel St.
Newton, Massachussetts 02160

EDUCATIONAL RESEARCH COUNCIL OF AMERICA
Man and the Environment

Author:	Frederick A. Rasmussen Paul Holobinko Victor Showalter
Publisher:	Houghton Mifflin Company Boston, Massachusetts
Publication Date:	1971
Availability:	From publisher
Grade Level:	7 - 9
Subject Area:	Life Science

Overview

This textbook has been developed as a series of life science investigations designed to help students develop insights about themselves, their biological environment, and real-life problems involving biology, technology, and society.

Required or Suggested Time

Intended for an academic year course, meeting five days a week for 40 minutes a day.

Intended User Characteristics

The materials were intended for junior high school students but not for any specific target group within this population.

Rationale and General Objectives

Two basic assumptions underlie Man and the Environment: one, that the essence of science includes the "how" as well as the "what"--that students must learn how scientific information is acquired as well as information itself; two, general ideas in life science have personal and social relevance.

These assumptions are translated into four general goals: 1) that students should demonstrate an inquiry approach to biology and be able to design and carry out simple experiments with living organisms; 2) students should understand the interaction between living organisms and their physical environment, recognizing the complexities of ecological situations; 3) students should be able to separate fact from opinion in a controversial ecological problem and state what social responsibilities

are involved; 4) students should be aware of individual variation in man and other organisms and recognize the uniqueness of each living thing.

Content

The book is divided into four units: 1) investigating living things, 2) the environment affects living things, 3) living things affect each other, and 4) man's effect on the environment. Students are presented with a series of problems, questions or issues to study, with each group of activities being entitled an "investigation." The amount of student freedom provided varies with the investigations, with early activities being the most structured.

Each investigation is composed of an introduction, objectives to be achieved, the problem or problems, and mastery items. Students as well as teachers are given the rationale and behavioral goals for the investigations.

In addition to the textual material, four "games" are suggested for use: "The Mouse in the Maze," "The Planet Management Game," "The Pollution Game," and "The Redwood Controversy." These must be purchased separately from, and are more expensive than, the book. The textbook could be used without the games, however.

Teaching Procedures

No specific training for teachers is involved in the use of these materials. A teacher's edition of the book is available and contains suggestions for teaching as well as annotations on the textual material.

Materials and Cost

Life Science, student book	$6.96
Teacher's edition	7.40
Check-points (tests)	1.20
Answers to tests	1.20
Laboratory supplement	1.40
"The Mouse in the Maze"	8.00
"The Planet Management Game"	16.00
"The Redwood Controversy"	10.00
"The Pollution Game"	12.00

ENGINEERING CONCEPTS CURRICULUM PROJECT (ECCP)
The Man Made World

Director(for materials development):	E. E. David, Jr. Bell Telephone Laboratories Murray Hill, New Jersey J. G. Truxal Polytechnic Institute of Brooklyn 333 Jay Street Brooklyn, New York
Project Address:	Commission on Engineering Education 1501 New Hampshire Ave.,N.W. Washington, D.C. 20036
Publisher:	McGraw Hill Book Company Manchester Road Manchester, Missouri 63011
Publication date:	1967
Availability:	Printed materials: From publisher Classroom equipment: American Machine and Foundry Company Alexandria, Virginia
Grade Level:	11 - 12
Subject Area:	Science

Overview

The Man Made World was developed as a result of work by the Engineering Concepts Curriculum Project, a joint effort of the Commission on Engineering Education and the Polytechnic Institute of Brooklyn, with support from the National Science Foundation. Designed to help students develop an understanding of the complexity of technological problems and the methods being used to solve them, The Man Made World looks at problems of pollution, population, health services, computers, and traffic control in terms of decision making.

Required or Suggested Time

Intended for an academic year of study.

Intended User Characteristics

The materials for the course have been designed to attract those high school students who do not now take a science elective beyond the 10th grade.

Rationale and General Objectives

The ECCP course has been developed as an alternative to other science courses, not as a replacement. It is based on technological concepts that have broad relevance and significance for society and is designed to provide "science shy" college preparatory students with an opportunity to understand certain principles in engineering, science, mathematics, and social studies which pervade the students' daily lives. Laboratory and computer facilities provide the students the opportunity to experiment and to translate abstract concepts into concrete situations.

Content

The course materials emphasize searching for, and exploring, ideas in terms of the study of significant, current problems. The material included is drawn from concepts in engineering, science, mathematics, and social studies. The course in independent of high school biology, physics, chemistry, and mathematics, although a background in mathematics is a prerequisite.

The textbook has three parts: Part A: Logic and Computers is concerned with logic and digital computation; Part B: Models and Measurement serves to introduce the student to models as tools for aiding human thought and understanding and for predicting; Part C: Energy and Control introduces the concept of feedback as a means of achieving a specific goal.

Teaching Procedures

The text material is supplemented by laboratory experiments performed by the students and by several demonstrations.

Materials and Cost

Man Made World	$11.95
Laboratory manual	2.40

Additional materials to be on market this spring

(1) teacher's manual plus transparencies
(2) teacher's manual (only)
(3) packet of five tests and final exam
(25 copies/packet)
(4) transparency masters

no prices yet set on the above 4 items

INFORMATION SOURCES

NATIONAL BUREAU OF STANDARDS
Office of Technical Information and Publications
National Bureau of Standards
Washington, D.C. 20234

SOIL CONSERVATION SERVICE
Educational Relations
Information Division
Soil Conservation Service
USDA
Washington, D.C. 20250

FOREST SERVICE
Chief,
Forest Service
U.S. Department of Agriculture
South Agriculture Building
Washington, D.C. 20250

AGRICULTURE RESEARCH SERVICE
Public Inquiries Unit, PB
INF Division
ARS, USDA
Room 724A, FCB
Hyattsville, Maryland 20782

ENVIRONMENTAL PROTECTION AGENCY
Environmental Protection Agency
Public Affairs Office
Public Inquiries
Rockville, Maryland 20852

DEPARTMENT OF TRANSPORTATION
Office of Environmental Policy
FHWA
U.S. Department of Transportation
Washington, D.C. 20591

ATOMIC ENERGY COMMISSION
Division of Public Information
Atomic Energy Commission
Washington, D.C. 20540

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
NASA Scientific and Technical Information Facility
P.O. Box 33
College Park, Maryland 20740

U.S. WATER RESOURCES COUNCIL
U.S. Water Resources Council
2120 L Street
Washington, D.C. 20037

TENNESSEE VALLEY AUTHORITY
TVA Information Office
Knoxville, Tennessee 37902

GEOLOGICAL SURVEY
Information Office
U.S. Geological Survey
Washington, D.C. 20240

FISH AND WILDLIFE SERVICE
Chief,
Office of Conservation Education
Fish and Wildlife Service
Department of the Interior
Washington, D.C. 20240

BUREAU OF OUTDOOR EDUCATION
Bureau of Outdoor Education
Department of the Interior
Washington, D.C. 20240

FOOD AND DRUG ADMINISTRATION
Office of Consumer Affairs
CE 10
Food and Drug Administration
U.S. Department of Health, Education, and Welfare
5600 Fishers Lane
Rockville, Maryland 20852

ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
Environmental Science Service Administration
U.S. Department of Commerce
Rockville, Maryland 20852

U.S. OFFICE OF EDUCATION
Office of Environmental Education
Regional Office Building
Seventh and D Street SW
Room 5914
Washington, D.C. 20202

FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
Federal Water Pollution Control Administration
Crystal Mall Building 2
1921 Jefferson Davis Highway
Arlington, Virginia 22203

ENVIRONMENTAL EDUCATION CURRICULUM ANALYSIS INSTRUMENT

1.0 IDENTIFICATION OF MATERIALS/PROGRAM

1.1 Project name _____

1.2 Sponsoring institution _____

1.3 Project address _____

1.4 Title of specific materials/program (if other than project name)

_____

1.5 SE, SO, or ED number _____

1.6 Project director _____

1.7 Funding sources _____

1.8 Duration of project _____ to _____

2.0 SOURCE(S) OF MATERIALS/PROGRAM DESCRIPTION, OR ADDITIONAL INFORMATION

2.1 Project address _____

_____

Items available: (Append materials list)

Materials	yes _____	no _____
Descriptive information	yes _____	no _____
Evaluative information	yes _____	no _____
Other (specify) _____		

2.2 Publisher address _____

_____

Items available: (Append materials list)

Materials	yes _____	no _____
Descriptive information	yes _____	no _____
Evaluative information	yes _____	no _____

2.3 Other source address _____

_____

3.0 COST: (Obtain following information for each item if possible, add to appended materials)

3.1 Materials

Texts - Manuals $ _____

Teacher guides $ _____

Other $ _____

$ _____

$ _____

3.2 Implementation

Staff $ _____

Facilities - Site $ _____

Materials - Equipment $ _____

3.3 Operation

Total cost $ _____

Cost per pupil $ _____

Transportation $ _____

Maintenance $ _____

4.0 MATERIALS, MEDIA

4.1 Materials furnished: (Check if furnished)

_____ Student text
_____ Teacher guide
_____ Teacher materials (transparency masters, etc.)
_____ Games/Simulations
_____ Laboratory kits
_____ Basic information manual or Data Book
_____ Operational (lab) manual
_____ Student workbook(s)
_____ Tests
_____ Other (specify) _____

4.2 Media used: (Check if furnished)

_____	Readings	_____	Indoor laboratory
_____	Maps, charts and/ or illustrations	_____	Outdoor laboratory
		_____	Library
_____	Films	_____	Classroom
_____	Filmstrips	_____	Home
_____	Slides	_____	Urban or suburban park
_____	Filmloops	_____	Camp
_____	Slide tapes	_____	Community business, agencies
_____	Tapes		
_____	Transparencies	_____	Computer
_____	Records	_____	Simulations/Games
_____	Artifacts	_____	Other (specify)
			_____

5.0 USER CHARACTERISTICS (Check those appropriate)

5.1 Target community characteristics:

Settlement type:

_____ Urban
_____ Suburban
_____ Rural
_____ Other (specify)_____

Socio-economic:

_____ Upper middle class
_____ Middle class
_____ Working class
_____ Poverty area
_____ Other (specify) _____
(Ethnic groups) _____

5.2 Special characteristics of student population:

_____ Mentally handicapped
_____ Physically handicapped
_____ Slow learners
_____ Fast learners
_____ Other (specify) _____

6.0 ORGANIZATION (Check those appropriate)

6.1 Grade level:

_____ 1-3
_____ 4-6
_____ 7-9
_____ 10-12
_____ Junior or community college

_____ Undergraduate
_____ Graduate
_____ Adult education
_____ Teacher education
_____ Continuing interest
_____ Other (specify)
_____

6.2 Length:

_____ Activity(ies)
_____ Unit (1-3 weeks)
_____ Unit (4-6 weeks)

_____ Semester
_____ Year
_____ More than a year

6.3 Sequence:

_____ Series of activities
_____ Series of units
_____ Special projects

_____ Course
_____ Series of courses
___ a. Block and gap
___ b. Spiral

6.4 Scope:

Social Science:

_____ Economics
_____ Geography
_____ Political science
_____ Law
_____ History

_____ Psychology
_____ Anthropology
_____ Sociology
_____ Other (specify)
_____

Natural-physical science:

_____ Ecology
_____ Biology
_____ Chemistry
_____ Meteorology
_____ Health and medicine
_____ Geology

_____ Physics
_____ Engineering
_____ Physical geography
_____ Agronomy
_____ Other (specify)
_____

Humanistic-aesthetic:

_____ Plastic arts
_____ Music
_____ Literature

_____ Philosophy
_____ Religion
_____ Other (specify)
_____

7.0 RATIONALE AND OBJECTIVES

7.1 Is the rationale behind the materials/program explained?
_____

7.2 Are there clearly stated objectives? _____

Are the objectives stated in behavioral terms? _____

7.3 Do the objectives emphasize: (Check appropriate)

_____ Cognitive development
_____ Affective development
_____ Psychomotor skills
_____ Other

8.0 CONTENT

8.1 Are the materials/program factually sound? _____

8.2 Are the materials/program intellectually sound? _____

8.3 Problems/issues:

_____ Pollution
- _____ Air
- _____ Water
- _____ Noise
- _____ Thermal
- _____ Solid Waste
- _____ Radiation
- _____ Aesthetic

_____ Health
- _____ Physical
- _____ Mental

_____ Resource use
- _____ Renewable
- _____ Non-renewable
- _____ Animal
- _____ Plant
- _____ Mineral

_____ Food production/supply/distribution
_____ Land use
_____ Recreation
_____ Population growth/distribution
_____ Population/resource ratio
_____ Political-legal jurisdictions
_____ Planning
- _____ Urban
- _____ Regional

_____ Economic development
_____ Urban problems
_____ Other (specify) _____
_____ Non-issue/problem oriented

8.4 Scale:

_____ Micro-system (e.g., vacant lot study)
_____ Neighborhood
_____ Community
_____ Metropolitan area
_____ State
_____ Natural or cultural interstate region
_____ U.S. region
_____ National
_____ World region
_____ World
_____ Other (specify)
_____
_____

9.0 APPROACH:

9.1 Multi- (inter-, cross-, non-) disciplinary approach:

_____ Draws from several of the natural-physical sciences (specify which)

_____ Draws from several of the social sciences (specify which)

_____ Draws from both natural-physical and social sciences (specify which)

_____ Based on a single discipline (specify)

9.2 Instructional Strategies

_____ Laboratory
_____ Field trips
_____ Exposition
_____ Stories
_____ Demonstrations
_____ Questions
_____ Tests
_____ Case studies
_____ Seminars
_____ Independent study
_____ Role playing
_____ Games
_____ Simulations
_____ Group discussions
_____ Debates
_____ Surveys and polls
_____ Other (specify)
_____

10.0 TEACHER PREPARATION:

10.1 Desirable education background (discipline concentrations)

_____

10.2 Amount of inservice training needed to implement:

_____ None
_____ 1-2 day workshop
_____ Longer workshop or institute
_____ Series of workshops

10.3 Kind of inservice training needed:

_____ Content
_____ Philosophy
_____ Skills

10.4 Team Teaching: _____ Required _____ Helpful

10.5 Other: _____

10.6 Amount of daily preparation time needed:

_____ More than 2 hours
_____ 2 hours
_____ 1 hour or less

11.0 EVALUATIVE DATA

11.1 Available from: _____

_____

_____

11.2 Nature of evaluative data available:

Performed by: _____

Formative _____ Summative _____

Reviewers judgment of the adequacy of evaluation done:

_____

Description (where tested, results, design of research, etc.):

_____

_____

_____

11.3 Availability of evaluation instruments for use by teacher:

Are methods suggested for determining whether stated objectives are met?

_____

Describe the suggested methods or instruments. _____

_____

_____

Are means provided for the learner to evaluate his own progress?

_____

Describe them. _____

_____

_____

Are diagnostic instruments suggested? _____

_____

Describe them. _____

_____

_____

12.0 OVERALL JUDGMENT AND COMMENTS OF THE REVIEWER

12.1 Overall rating of the materials/program by the reviewer:

' ' ' ' ' ' '

Low High

12.2 Explanation of overall reaction to the materials/program by the reviewer:

_____

_____

_____

_____

_____

12.3 Unique characteristics of materials/program not covered in previous sections:

_____

_____

13.0 INFORMATION DISSEMINATION:

13.1 Site visits permitted: _____

13.2 Provide consultants: _____

_____ At program site

_____ Will travel

13.3 Provide materials

_____ Samples

_____ Complete set

_____ Descriptive only

LEARNING APPROACHES TO ENVIRONMENTAL EDUCATION*

Suggested Learning Approaches

The group at Riverside and the group at Bowling Green placed slightly different emphasis when consideration was given to the learning approaches to be used. One group emphasized suggestions for elementary levels, and the other group considered approaches for junior-senior high school students. The two viewpoints show a striking similarity, and general agreement. Both are included here to show the close resemblance of thinking that existed between the two groups, widely separated geographically but exceptionally similar in their thinking.

LEARNING APPROACHES AT ELEMENTARY LEVELS:

1. INTERDISCIPLINARY APPROACH. Because man's relationship with his physical environment is so directly dependent upon the social, political, and economic values of his culture, any environmental education program requires the involvement of all disciplines, particularly the social studies. So, too, however, must the arts and humanities be actively involved, for man's affective domain must also be touched. "We have to understand that we live our lives affectively but explain them cognitively."[1]

   If programs are to be interdisciplinary, we must establish a common language, to transcend the difference between disciplines and to establish the interrelatedness of environmental problems, social and physical.

2. INTEGRATIONAL APPROACH. Not only is it usually impossible to add another subject to the elementary curriculum, it is not always desirable to do so. In the case of environmental education, we would focus on relationships and problems which are closely related to subjects already being taught. Environmental education can function as a natural synthesis of other subjects. And the existing facilities and surroundings can be used. Perhaps in some situations it might be more desirable at the secondary level to offer environmental education as a distinct and separate unit or course.

3. RELEVANCE TO THE INDIVIDUAL. The program will be man-centered. Because the human ecosystem differs so greatly from other ecosystems, with the inclusion of culture and technology, man's own unique characteristics should be the focus.

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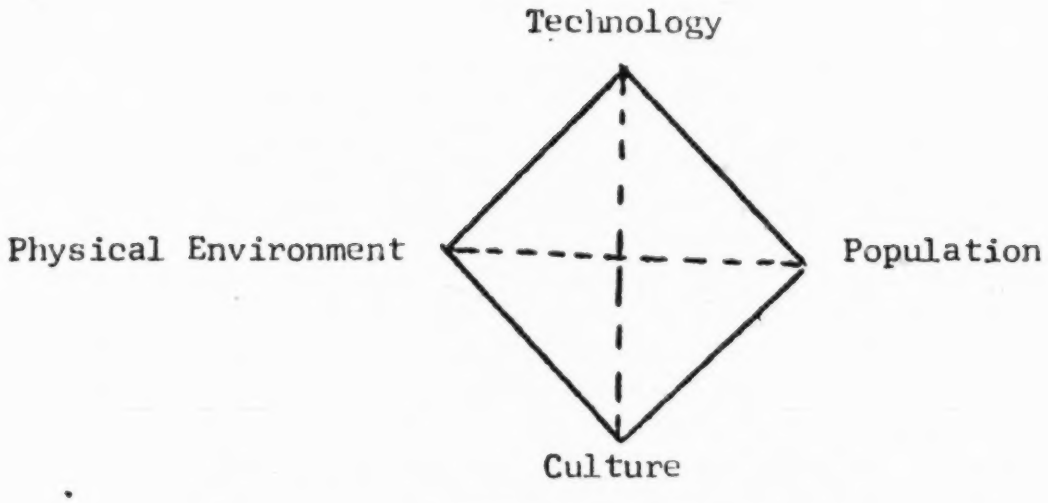
[1]Samples, Robert E. "Toward the Intrinsic: A Plea for the Next Step in Curriculum." The American Biology Teacher, March 1970. p. 148.



HUMAN ECOSYSTEM

Environmental problems must be made real to the experience of each student. Just as it is educational suicide to speak to a black student in Detroit about the rebellious Bostonians killed in the Boston Massacre of 1770 while not mentioning the relevance of the people of his own race killed during recent riots, so also is it folly to dwell on the removal of a bird sanctuary in Florida with a class of students whose central city park is being bulldozed for new freeway construction. People must learn about their own surroundings first.

4. STUDENT INVOLVEMENT. Students learn best through their own real life experiences. "If a person is to grow up, he needs first of all access to things, to places and to processes, to events, to records. He needs to see, to touch, to tinker with, to grasp whatever there is in a meaningful setting."[2] All these needs demand "doing" in the classroom and also demand that teachers promote processes that will facilitate self-directed learning. Teachers and students must have a choice of activities, not just one, in order to capitalize on timely events and on student excitement. Students must be allowed free discovery and be encouraged to "show the teacher a few things."

5. COMMUNITY AND PARENT INVOLVEMENT. Because attitudes and values are formed primarily outside the classroom, and because parents and community members may also be interested in the issues of environmental problems, active participation of parents and others in the community will be encouraged.

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[2]Illich, Ivan. "The Alternative to Schooling." Saturday Review, June 19, 1971. p. 48.

6. FOCUS ON CONFLICT OF INTERESTS. Environmental education must allow students to see all options to fully comprehend conflict of interests behind many environmental problems and their solutions. The complexities of economic, social, and political interests require that we become aware of what we must give up to gain something else. At every level then, students should be involved in informal "cost/benefit" or systems analysis.

LEARNING APPROACHES FOR JUNIOR-SENIOR HIGH SCHOOL STUDENTS:

1. THE APPROACH SHOULD BE INTERDISCIPLINARY. Suggestions: Bring the different disciplines together in the treatment of a problem, rather than breaking the problem down into subject areas. The most effective learning will occur when the information and skills needed to solve a problem are brought together to achieve the specific goal.

2. THE APPROACH SHOULD BE LEARNER CENTERED. The teacher should be a facilitator, resource person, leader, and advisor, and learning should be individualized.

   a. Each student should work at his own pace.

   b. Learning activities should be adapted to the learner's needs and interests.

   c. There should be a variety of learning activities, including large group, small group, and individual tasks.

   d. Students should be involved in selecting the problems and in planning the procedures and techniques for solving them.

3. THE APPROACH SHOULD BE PROBLEM ORIENTED.

   a. Problems, rather than a content outline, should form the basis for designing the course. This does not eliminate the usefulness of a course outline, however, as a means of identifying the ideas and concepts to be included in the course.

   b. Basic principles and facts should be introduced when needed, rather than "taught" in a rigid sequence.

   c. Problems must be well defined and understood by all, and related to the students' concerns.

   d. The end product should include proposed alternatives for action. Students should learn that many problems have no known solutions and be aware of the necessity for "trade-offs"--every alternative has a cost.

e. There should be reasonable balance in the choice of problems to be studied.

4. THE APPROACH SHOULD RESULT IN BEHAVIORAL CHANGES.

a. Effective behavioral change is a life-time process. It cannot be completed in one semester or even in one year. The course should be considered as a segment of the total process of behavioral change, and provision should be made for continuing activities with the students, long after the termination of the formal course.

b. Affective and psychomotor aspects of learning should be considered along with cognitive aspects, to provide balanced learning experiences.

c. The need for student involvement is imperative at every stage of the learning process.

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*From the Report of the Environmental Education Workshops at Riverside, California and Bowling Green Ohio, sponsored by the National Science Teachers Association, 1971.